

Record of Decision, Former Pearl City Junction

PEARL CITY, OAHU, HAWAII

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**Department of the Navy
Naval Facilities Engineering Command, Hawaii
400 Marshall Road
Pearl Harbor, HI 96860-3139**



**Comprehensive Long-Term Environmental Action Navy
Contract Number N62742-03-D-1837, CTO HC03**

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ACRONYMS AND ABBREVIATIONS

| | |
|-----------------|-----------------------------------------------------------------------|
| ARAR | applicable or relevant and appropriate requirement |
| bgs | below ground surface |
| Bldg. | building |
| BWS | Board of Water Supply, City and County of Honolulu |
| CCH | City and County of Honolulu |
| CERCLA | Comprehensive Environmental Response, Compensation, and Liability Act |
| CFR | Code of Federal Regulations |
| cm/sec | centimeter per second |
| COPC | chemical of potential concern |
| DoD | Department of Defense |
| DOH | Department of Health, State of Hawaii |
| DRMO | Defense and Reutilization Marketing Office |
| EAL | environmental action level |
| EPA | Environmental Protection Agency, United States |
| ER | Environmental Restoration |
| ERA | ecological risk assessment |
| FFS | focused feasibility study |
| FISC | Fleet and Industrial Supply Center |
| ft ² | square feet or foot |
| LUC | land use control |
| mg/kg | milligrams per kilogram |
| MSA | Manana Storage Area |
| NAVFAC Hawaii | Naval Facilities Engineering Command, Hawaii |
| NAVFAC Pacific | Naval Facilities Engineering Command, Pacific |
| NCP | National Oil and Hazardous Substances Pollution Contingency Plan |
| no. | number |
| NPL | National Priorities List |
| PA | preliminary assessment |
| PCB | polychlorinated biphenyl |
| PCJ | Pearl City Junction |
| PHNC | Pearl Harbor Naval Complex |
| PHNWR | Pearl Harbor National Wildlife Refuge |
| PP | proposed plan |
| PRE | preliminary risk evaluation |
| PRG | preliminary remediation goal |
| RAB | Restoration Advisory Board |
| RACER | remedial action cost engineering and requirements |
| RAWP | remedial action work plan |
| RGA | regional groundwater assessment |
| RI | remedial investigation |
| ROD | record of decision |
| SI | site inspection |
| SSL | soil screening level |
| TBC | to be considered |
| TFH | total fuel hydrocarbons |
| TPH | total petroleum hydrocarbons |
| U.S. | United States |

| | |
|------|-------------------------------------|
| UECA | Uniform Environmental Covenants Act |
| VOC | volatile organic compound |

1. Declaration

1.1 SITE NAME AND LOCATION

The United States (U.S.) Navy (Navy) has prepared this record of decision (ROD) for the Former Pearl City Junction (PCJ) Site, Pearl City, Oahu, Hawaii. The Former PCJ Site occupies 13.7 acres south of Kamehameha Highway and west of the intersection of Kamehameha Highway and Waimano Home Road on the island of Oahu, Hawaii (Figure 1). The southern boundary of the site is approximately 0.9 mile from the shoreline of the Middle Loch of Pearl Harbor. The Former PCJ Site is administered by Naval Facilities Engineering Command, Hawaii (NAVFAC Hawaii), and is part of the Pearl Harbor Naval Complex (PHNC). The PHNC was added to the National Priority List (NPL) on 14 October 1992. The NPL identifies priorities among sites of known or threatened releases of hazardous substances, pollutants, or contaminants throughout the United States (U.S.) and its territories. The PHNC is identified as site number (no.) HI4170090076 in the U.S. Environmental Protection Agency (EPA) Comprehensive Environmental Response, Compensation, and Liability Information System.

This ROD has been prepared for NAVFAC Hawaii under the Comprehensive Long-Term Environmental Action Navy III program, contract no. N62742-03-D-1837, contract task order no. HC03.

1.2 STATEMENT OF BASIS AND PURPOSE

This ROD documents for the Administrative Record the decision by the Navy and the U.S. Environmental Protection Agency (EPA), with concurrence from the Hawaii Department of Health (DOH), to implement land use controls (LUCs) as the final remedy for the Former PCJ Site. The final remedy for the Former PCJ Site has been selected in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) (as amended by the Superfund Amendments and Reauthorization Act [SARA]), the National Oil and Hazardous Substances Pollution Contingency Plan (NCP) (40 Code of Federal Regulations [CFR] 300.430(e)(a)(iii)), and Presidential Executive Order 12580. Information supporting the decisions leading to the selected remedy is contained in the Administrative Record file for the site. The decision to implement the final remedy identified in this ROD is based on and relies on the entire Administrative Record for the Former PCJ Site. Information not specifically summarized in this ROD or its references but contained in the Administrative Record has thus been considered and is relevant to selection of the remedy.

The Navy is the lead agency for the Former PCJ Site; the EPA and DOH are support agencies. The *Federal Facilities Agreement (FFA) for the Pearl Harbor Naval Complex*¹ documents how the Navy intends to meet and implement the CERCLA in partnership with the EPA and DOH (EPA, State of Hawaii, and DON 1994). CERCLA environmental investigations at the Former PCJ Site began in 1988 with a Preliminary Assessment (NEESA 1988). This ROD documents the final remedial action selected for the Navy's Former PCJ Site and does not include or affect any other sites. No CERCLA enforcement actions have been issued for the Former PCJ Site.

¹ Text in blue font identifies where detailed site information is available via hyperlink while viewing this ROD as a PDF. The detailed information is viewable by clicking on the blue text within the PDF.

1.3 SITE ASSESSMENT

Soils with chemical concentrations exceeding DOH-approved cleanup goals designed to protect human health under the commercial/industrial land use scenario have been removed from the Former PCJ Site, thus reducing risk to industrial or commercial receptors to acceptable levels. However, hazardous substances remain in subsurface soil at concentrations that could pose unacceptable risk to human health if unlimited or unrestricted use of the site is allowed. The response action selected in this ROD is therefore necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment.

1.4 DESCRIPTION OF THE SELECTED REMEDY

This ROD identifies LUCs as the response action selected as the final remedy for the Former PCJ Site. The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. The selected final remedy (as well as previous response actions) addresses subsurface soil containing polychlorinated biphenyls (PCBs) and dieldrin at concentrations that could pose unacceptable risk to humans if unlimited or unrestricted use of the site is allowed. Concentrations of these chemicals are acceptable for industrial/commercial use; therefore, the LUCs will ensure that risks to human health and the environment remain acceptable by prohibiting activities other than commercial or industrial operations in the areas where chemical concentrations in soil exceed levels that would allow for unrestricted land use and unlimited human exposure. The LUCs will be maintained as long as required to ensure protection of human health and the environment. The Navy will prepare a *Remedial Action Work Plan (RAWP)* to document the methods and procedures that will be used to implement the LUCs.

1.5 STATUTORY DETERMINATIONS

The selected remedy for the Former PCJ Site is protective of human health and the environment, complies with Federal and State requirements that are applicable or relevant and appropriate (ARAR), is cost-effective, and utilizes permanent solutions and alternative treatment (or resource recovery) technologies to the maximum extent practicable. The selected remedy does not satisfy the statutory preference for treatment as a principal element of the remedy because treatment is not necessary to protect human health or the environment under the current and future land use scenarios (commercial/industrial), and is not a cost effective remedial alternative for the site. Because the selected remedy will result in hazardous substances, pollutants, or contaminants remaining on site at concentrations above levels that allow for unlimited use and unrestricted exposure, statutory reviews will be conducted every 5 years following the initiation of remedial action, as required under CERCLA Section 121(c) and the NCP 40 CFR 300.430(f)(4)(ii). The 5-year reviews will be performed to ensure that the remedy remains protective of human health and the environment.

1.6 DATA CERTIFICATION CHECKLIST

The following information is presented in the Decision Summary section of this ROD (Section 2). Additional supporting information and data for the Former PCJ Site, including a *Focused Feasibility Study (FFS)* (Earth Tech 2008) and *Proposed Plan (PP)* (DON 2009), is available in the Administrative Record file.

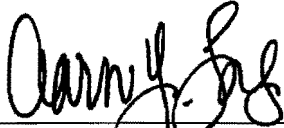
- Chemicals of concern (Section 2.2)
- Current and reasonably anticipated future land and groundwater use (Section 2.4)
- Human health and ecological risks (Section 2.5)
- Principal threat wastes (Section 2.6)

- Estimated capital costs; annual operation and maintenance costs; and total present-worth costs, discount rate, and the number of years over which the remedy cost estimates are projected (Section 2.8 [details presented in Attachment C])
- Key factors that led to selecting the final remedy (Section 2.8)

If contamination posing unacceptable risks to human health or the environment is discovered after execution of this ROD, the Navy will undertake all necessary actions required to ensure continued protection of human health and the environment.

1.7 SIGNATURE AND SUPPORT AGENCY ACCEPTANCE OF FINAL REMEDY

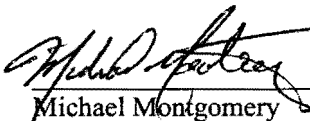
The Navy and EPA, with concurrence from the DOH, have selected LUCs to complete the final remedy for the Former PCJ Site as described in this ROD, and have determined that the final remedy is protective of human health and the environment. In accordance with CERCLA requirements, 5-year reviews will be performed to ensure that the selected final remedy remains protective of human health and the environment at the Former PCJ Site, PHNC, Oahu, Hawaii.



Aaron Y. Poentis
Regional Environmental Program Manager
By direction of: Commander, Navy Region Hawaii

9/23/10

Date



Michael Montgomery
Chief, Federal Facility and Site Cleanup Branch
Superfund Division, U.S. EPA Region 9

9/27/10

Date

The State of Hawaii DOH concurs with the selected remedy as documented in this Record of Decision.



Keith Kawaoka
Program Manager
Hazard Evaluation and Emergency Response Office
State of Hawaii, Department of Health

9-29-10

Date

2. Decision Summary

This section summarizes site characteristics, potential human health risks, potential ecological risks, evaluation of response action alternatives, and the rationale for the decisions that led to selection of the final remedy for the Former PCJ Site.

2.1 SITE DESCRIPTION AND HISTORY

The Former PCJ Site occupies 13.7 acres south of Kamehameha Highway and west of the intersection of Kamehameha Highway and Waimano Home Road on the island of Oahu, Hawaii (Figure 1). The southern boundary of the site is approximately 0.9 mile from the shoreline of the Middle Loch of Pearl Harbor. Four warehouse buildings and an open storage area formerly existed at the site (Figure 2). Another PHNC NPL site, the Former Manana Storage Area (MSA) Site, occupies approximately 109 acres across (north) of Kamehameha Highway from the Former PCJ Site.

The Navy's Fleet and Industrial Supply Center (FISC) acquired the PCJ property in 1944, and constructed four warehouse buildings at the site. The FISC used the site to store nonhazardous war supplies until 1962, when the Defense and Reutilization Marketing Office (DRMO) began using the site to store and distribute excess materials. The DRMO used buildings (Bldgs.) 1, 2, and 3 primarily for storage of general cargo. Approximately one-third of Bldg. 4 was used to receive excess materials that were sold to the public; the remaining portion was used for offices and a public auction bidding area. Although products including lime, fuel, hydraulic fluid, photographic chemicals, and paints were stored in Bldg. 4, no spills were reported (Ogden 1994). In 1984, the DRMO vacated Bldg. 2, and the Navy Exchange began using it as a rental storage facility for military personnel. In 1988, the DRMO vacated Bldgs. 1 and 3 and the eastern and central portions of Bldg. 4. From 1988 through 1989, various tenants used the warehouse buildings for nonhazardous material storage (Ogden 1994).

From 1962 through 1989, the DRMO used the open area south of Bldg. 4 for storage of tires and surplus vehicles that were later sold to the public. Transformers containing PCBs and other deteriorating and leaking containers were also stored in the open area (Ogden 1994). All the warehouse buildings have been demolished.

In 1994, the Navy submitted an *Environmental Baseline Survey for Transfer* (Ogden 1994) and a *Finding of Suitability to Transfer* the PCJ Site (DON 1994). The property then transferred from the Navy to the State of Hawaii on 29 July 1994 pursuant to a Quitclaim Deed recorded in the State of Hawaii, Bureau of Conveyances, as Document no. 94-127207. Immediately following recording of the Navy Quitclaim Deed, the property again transferred to the City and County of Honolulu (CCH) pursuant to a Quitclaim Deed recorded in the State of Hawaii, Bureau of Conveyances, as Document no. 94-127208. The Quitclaim Deed reserves right of access to the property for the Navy for the purpose of performing environmental remediation. In early 2000, the CCH sold the property to the commercial firm Home Depot, Inc. An *Environmental Agreement and Modification of Reserved Access Right* between the Navy and Home Depot (Latham & Watkins 1999) documents covenants that restrict land use to commercial or industrial, and grants right of access to the property to the Navy for the purpose of performing environmental remediation. By Special Warranty Deed recorded in the State of Hawaii Bureau of Conveyances, as Document No. 2003-01959, Home Depot conveyed the eastern end of the property to Public Storage, LLC.

2.2 PREVIOUS INVESTIGATIONS AND RESPONSE ACTIONS

The results of the environmental investigations and response actions performed to address hazardous substances and petroleum potentially released at the Former PCJ Site are summarized in this section.

All investigations and response actions were conducted in accordance with CERCLA and other ARARs identified for the Former PCJ Site.

2.2.1 Previous Investigations

The Navy and U.S. Air Force have investigated the site to evaluate the nature and extent of contamination, assess potential risks to human health, and design the response actions required to ensure that the Former PCJ Site does not pose unacceptable risk to human health or the environment.

- 1988: *Preliminary Assessment (PA)* (NEESA 1988)
- 1990 – 1991: *Site Inspection (SI)* (Ogden 1993)
- 1993: *Baseline Risk Assessment* (NEHC 1993)
- 2001 – 2002: *Regional Groundwater Assessment (RGA)* (Earth Tech 2003)
- 2007 – present: *Air Force Remedial Investigation (RI)* (TEC 2007a,b)

2.2.1.1 PRELIMINARY ASSESSMENT (1988)

In 1988, the Naval Facilities Engineering Command, Pacific (NAVFAC Pacific) conducted a PA to identify potential threats to human health or the environment associated with chemicals potentially released at the site (NEESA 1988). Based on a records search, interviews, and the lack of evidence of hazardous substance release, the PA report recommended no further action for the site under the NAVFAC Pacific ER Program; however, the EPA Region 9 did not concur with this recommendation.

2.2.1.2 SITE INSPECTION (1990 – 1991)

The Navy Public Works Center initially sampled soil at the PCJ Site in November 1990. The analytical results indicated that elevated levels of PCBs occurred in soils within the open storage area in front of Bldg. 4. This sampling was followed by a SI (Ogden 1993) to assess whether hazardous substances had been released at the site, identify the types of chemicals that were released, and evaluate potential risks to human health and the environment. Soil samples collected from the eastern third of Bldg. 4 and the open storage area were submitted for analysis of total petroleum hydrocarbons (TPH), total fuel hydrocarbons (TFH), volatile organic compounds (VOCs), semivolatile organic compounds, PCBs, chlorinated pesticides, metals, and hydrogen ion concentration. Because results indicated elevated levels of PCBs, dieldrin, metals, and TPH/TFH in the soil, the SI report recommended further evaluation of the site and delineation and remediation of dieldrin, beryllium, copper and TPH/TFH (removal of PCBs was already scheduled). Because TPH/TFH was detected only at locations with elevated PCB or dieldrin concentrations, the TPH were considered to be associated with these chemicals (Ogden 1993). After reviewing the SI report, the DOH recommended soil remediation with site-specific cleanup goals for PCBs, dieldrin, TPH, and metals (Ogden 1993).

2.2.1.3 BASELINE RISK ASSESSMENT

A Baseline Risk Assessment for the Former PCJ Site completed in August 1993 assessed [risks associated with human and environmental exposure](#) to all the chemicals identified in the SI and by regulatory agencies (NEHC 1993). The Baseline Risk Assessment evaluated exposure pathways for the future outdoor/indoor commercial/industrial worker, future trespassing child and adult, current future nearby resident, future construction workers, current and future school child, and current and future school faculty/staff. The Baseline Risk Assessment report concluded that the site posed no unacceptable risk to ecological receptors at the site or to nearby critical habitat areas, and that the site

“does not pose an unacceptable health risk, as defined by EPA, to current and future nearby residents or to students and adults at the Pearl City Elementary School.” However, the Baseline Risk Assessment report also concluded that future trespassers, commercial workers, and construction workers could be exposed to potential health risk if no further action were taken at the site, and noted that PCBs and dieldrin in soil were the cause of the majority of the potential risk. The report also stated that transport off site or to deeper soil depths was not expected, and recommended removal of soils with PCB and dieldrin concentrations exceeding specified cleanup goals followed by backfilling with at least 10 inches of clean soil. In addition, the report recommended implementing institutional controls to limit the use of the site to commercial/industrial purposes (NEHC 1993). The DOH concurred with the Baseline Risk Assessment report recommendations and approved the cleanup goals specified for the site.

2.2.1.4 REGIONAL GROUNDWATER ASSESSMENT (2001 – 2002)

In 2001 and 2002, five groundwater monitoring wells were installed at the Former PCJ Site as part of a RGA to evaluate the potential for contamination resulting from historic activities at the Former MSA and Former PCJ Sites, and assess the potential for interconnectivity between groundwater beneath the sites. The RGA groundwater samples were analyzed primarily to evaluate the nature and extent of the constituents identified as chemicals of potential concern (COPCs) for the Former MSA and Former PCJ Sites (arsenic, copper, lead, zinc, dieldrin, PCBs, and VOCs). However, because petroleum product was observed in soil cuttings from two of the five borings, subsurface soil samples were collected from the borings and analyzed for metals, TPH, VOCs, and polynuclear aromatic hydrocarbons. Ethylbenzene, TPH-gasoline range organics, and arsenic concentrations above risk-based screening criteria were detected in a soil sample from one of the borings. No PCBs or dieldrin (the principal COPCs identified for the Former PCJ Site) were detected in the subsurface soil or groundwater samples collected during the RGA. Fuel fingerprinting analysis indicated that constituents of the product observed in the two soil borings were consistent with aviation gasoline. No Navy activities involving aviation fuel are recorded for the Former PCJ Site; however, Air Force pipelines located along and directly upgradient of the northern site boundary historically carried aviation gasoline (Figure 2).

The [Conceptual Site Model Summary Diagram](#) developed for the RGA indicated that the COPCs associated with Navy activities at the two sites are not likely to be transported from soil to groundwater, and that the groundwater bodies beneath the Former MSA and Former PCJ Sites are not connected. The RGA report recommended further characterization of groundwater at the Former PCJ Site and further evaluation of the fuel-related contamination (Earth Tech 2003). The Navy discussed the fuel-related impacts in soil and groundwater at the site with the Air Force, and the Air Force agreed to characterize and remediate the contamination as required to protect human health and the environment. The RGA recommended no further Navy action for groundwater because none of the chemicals detected in the groundwater are attributable to past Navy operations.

2.2.1.5 AIR FORCE REMEDIAL INVESTIGATION (2007)

The Air Force conducted a RI to characterize the [nature and extent of soil and groundwater contamination](#) attributable to releases from the fuel pipelines, and submitted a RI Report to the DOH in August 2007 (TEC 2007a). In November 2007, the Air Force submitted a RI Work Plan Addendum for additional investigation to further characterize the extent of fuel-related contamination at the site, which the Air Force identified as ST18A, Hickam petroleum, oil, and lubricants Site (TEC 2007b).

2.2.2 Previous Response Actions

This section describes previous response actions performed to ensure that the Former PCJ Site does not pose unacceptable risk to human health or the environment under the current and potential future land and groundwater use scenarios.

- 1993 – 1994: PCB and Dieldrin Removal Action (DON 1993; OHM 1994)
- 1998: Second PCB Removal Action (OHM 1999)
- 2000: Air Force Fuel Pipeline Removal (DON 2002)

2.2.2.1 1993–1994 REMOVAL ACTION

In 1993 and 1994, soil with PCB concentrations exceeding the DOH-approved cleanup goal for total PCBs 10 milligrams per kilogram (mg/kg) was removed from the western section of the open storage area, and the excavated areas were backfilled with clean soil. The results of verification sampling conducted to confirm removal of the PCB-impacted soil are presented in a Verification Sampling Report (Ogden 1997). The 1993–1994 removal action also included excavation and disposal of soil with dieldrin concentrations exceeding the DOH-approved cleanup goal for dieldrin (1 mg/kg). The dieldrin-impacted soil was generally restricted to depths of 1 foot or less, and was removed from an area in the southeast corner of the open storage area. The excavation area was [backfilled with clean soil](#), and the contaminated soil was disposed of at a CERCLA-approved facility on the U.S. mainland. Successful completion of the dieldrin removal is documented in a *Closure Report* (OHM 1994). An [Action Memorandum](#) (DON 1993) was prepared to request and document approval of the dieldrin removal action.

2.2.2.2 1998 REMOVAL ACTION

In July 1997, Home Depot, Inc., as a prospective buyer, collected soil samples from the west-central area of the open storage area, and detected PCB concentrations above the DOH-approved cleanup goal for total PCBs (10 mg/kg). The Navy then performed an initial round of soil sampling to confirm the presence of soil with PCB concentrations above the cleanup goal, and conducted delineation sampling to define the extent of the PCB-impacted soil. The impacted soil was then excavated and disposed of at a CERCLA-approved facility on the U.S. mainland. Verification soil samples collected from the excavation indicated that soil with PCB concentrations above the cleanup goal remained; further delineation and excavation were therefore performed to remove the impacted soil. A second set of [post-excavation verification](#) soil samples was collected, and the analytical results showed that the cleanup goal had been achieved. The excavation area was backfilled with clean soil and the impacted soil was disposed of at a CERCLA-approved U.S. mainland facility. Successful completion of the removal action is documented in a *Remediation Verification Report* (OHM 1999).

2.2.2.3 FUEL PIPELINE REMOVAL (2000)

U.S. Air Force documents identify a former Air Force fuel pipeline that ran generally east-west along the northern boundary of the Former PCJ Site. The Air Force indicated that this pipeline historically carried aviation fuels and automotive gasoline (URS 2002, USGS 1990). Home Depot, Inc. removed this pipeline in June–July 2000. No apparent impact (odors or field equipment readings) was observed in soil during the removal (DON 2002). Figure 2 shows the approximate alignment of the removed pipeline, as well as the approximate alignment of a second Air Force fuel pipeline that was abandoned in place. The abandoned pipeline also reportedly carried aviation fuels and automotive gasoline.

2.3 SITE CHARACTERISTICS

This section describes site characteristics that could affect the nature, extent, fate, and transport of chemicals potentially released at the Former PCJ Site.

2.3.1 Physical Setting

The Former PCJ Site is located in an urban setting dominated by commercial/industrial facilities and paved roadways. The ground surface is flat and covered by pavement and commercial structures. A Home Depot, Inc. retail store is located at the west end of the site, and a Public Storage, Inc. facility is located at the east end. The area between the two facilities is covered by a parking lot. Except for two small lawn areas near the Home Depot, Inc. loading dock area at the west end of the store and several small landscaped areas in the parking lot, the entire site is covered by the Home Depot, Inc. store, the Public Storage facility, and concrete or asphalt pavement. U.S. Air Force documents identify a former Air Force pipeline adjacent to the northern property boundary, trending generally east/west. The Air Force indicated that the line historically carried aviation fuel and automotive gasoline (URS 2002; USGS 1990). Home Depot, Inc. removed this pipeline in June–July 2000. A second Air Force aviation fuel and gasoline pipeline parallels the northern boundary of the Former PCJ Site; this pipeline is inactive but remains in place.

2.3.2 Geology

This section briefly summarizes the geology of the Former PCJ Site. Details of the regional and local geology are presented in the [RGA Report](#) (Earth Tech 2003).

2.3.2.1 SITE SPECIFIC GEOLOGY

Results of the RGA and other geologic investigations in the Pearl Harbor area indicate that the Former PCJ Site is located immediately seaward of the inland edge of the caprock formation, which consists of a complex sequence of alluvial and marine sediments, including sand, gravel, and low permeability beds of clay and silt (Wentworth 1951; MacDonald et al. 1983). At the Former PCJ Site, the caprock formation overlies the Koolau Basalt, and confines groundwater within the highly permeable basalt.

Borings for the monitoring wells installed at the Former PCJ Site during the RGA (MW-04, MW-05, MW-06, MW-07, and MW-08) (Figure 2) reached depths ranging from approximately 20 to 40 feet below ground surface (bgs). The boring logs indicate that soil beneath the pavement is fill material consisting of sandy gravel, silty gravel, clayey gravel, and gravel to depths of approximately 15 feet bgs; the interval between 15 feet bgs and the bottom of the deepest boring is dominated by low-permeability strata (i.e., silt and clay) of the underlying caprock formation (Earth Tech 2003).

2.3.3 Hydrology and Hydrogeology

This section briefly summarizes the hydrology and hydrogeology of the PHNC area and Former PCJ Site. Details of the hydrology and hydrogeology are presented in the [RGA Report](#) (Earth Tech 2003).

2.3.3.1 REGIONAL HYDROLOGY

Perennial stream flow occurs in the upper mountainous portions of Oahu drainages because of persistent rainfall throughout the year. On the coastal plain, below an elevation of about 25 feet above mean sea level, perennial stream flow occurs if there is sufficient discharge from groundwater. However, none of the streams are perennial throughout their entire lengths (NEESA 1983).

2.3.3.2 SITE HYDROLOGY

The closest surface water bodies to the Former PCJ Site are Waiawa Stream and Waiawa Spring. Waiawa Stream is located approximately 250 feet west of the southwest corner of the site at the nearest point, and meanders south for approximately 6,000 feet before discharging into the Middle Loch of Pearl Harbor. Waiawa Spring is located approximately 2,000 feet southwest of the site, and feeds a small unnamed stream that flows southwestward for approximately 1,500 feet before entering

Middle Loch. The spring discharge is also used for irrigation and to supply fresh water to the Waiawa Unit of the Pearl Harbor National Wildlife Refuge (PHNWR) (located approximately 2,500 feet southwest of the Former PCJ Site). There is no evidence of a surface water connection between Waiawa Spring and either the Former PCJ Site or Waiawa Stream. Surface water runoff from the Former PCJ Site drains into the storm sewer system.

2.3.3.3 REGIONAL HYDROGEOLOGY

The hydrogeologic characteristics of the Former PCJ Site are common in the Hawaiian Islands. Two distinct types of groundwater occur in the site area:

- A deep regional basal aquifer
- A near-surface water-bearing zone within the caprock formation

Both the near-surface caprock groundwater and the deep basal groundwater generally flow toward Pearl Harbor, and are recharged by infiltration from rainfall, streams, and irrigation.

Basal Aquifer. The basal aquifer underlies the Former PCJ Site at depth (approximately 100 feet bgs) and is part of the Pearl Harbor Aquifer, the most productive aquifer in the State of Hawaii. The basal groundwater originates as rainwater falling in drainage basins at high elevations to the north and northeast and percolating downward to the basal aquifer within the basalt bedrock. The basal groundwater migrates seaward through zones of highly permeable, fractured basalt, and flows beneath the low-permeability caprock formation as it approaches the shoreline (Wentworth 1951; Mink 1980; Mink et al. 1988). Horizontal hydraulic conductivities in the fractured basalts of the Pearl Harbor Aquifer range from approximately 9×10^{-2} centimeters per second (cm/sec) to 7×10^{-1} cm/sec, and the regional hydraulic gradient averages approximately 0.0003 feet per foot.

Caprock Groundwater. The near-surface (approximately 30–36 feet bgs) caprock groundwater occupies low-permeability sediments that overlie and confine the basal groundwater within the basaltic bedrock that underlies the Pearl Harbor area. The caprock groundwater is recharged by water that infiltrates the near-surface sediments and percolates downward to the caprock saturated zone. The caprock groundwater also may be recharged in some areas by upward leakage from the basal aquifer; however, based on the data and information acquired during the RGA, this does not occur at the Former PCJ Site (Earth Tech 2003).



2.3.3.4 SITE HYDROGEOLOGY

Hydrogeologic data collected during the RGA provide evidence of the significant differences between the basal aquifer and the caprock groundwater:

- Monitoring wells at the Former PCJ Site (MW-04 through MW-07 and CCH Board of Water Supply [BWS] monitoring well 2358-20) are screened entirely in the caprock formation (i.e., they do not penetrate the underlying basalt), and demonstrate substantial variations in groundwater elevations across the site.
- Monitoring wells located inland of the Former PCJ Site are screened in the Koolau basalt, and show water levels consistent with the unconfined basal aquifer (Pearl Harbor Aquifer).



LEGEND

-  Existing Building
-  Site and LUC Area Boundary

SOURCES

1. URS (2002)
2. USGS (1990)

KEY MAP

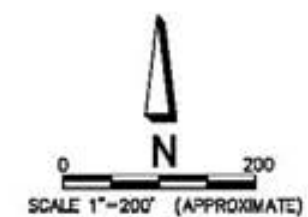
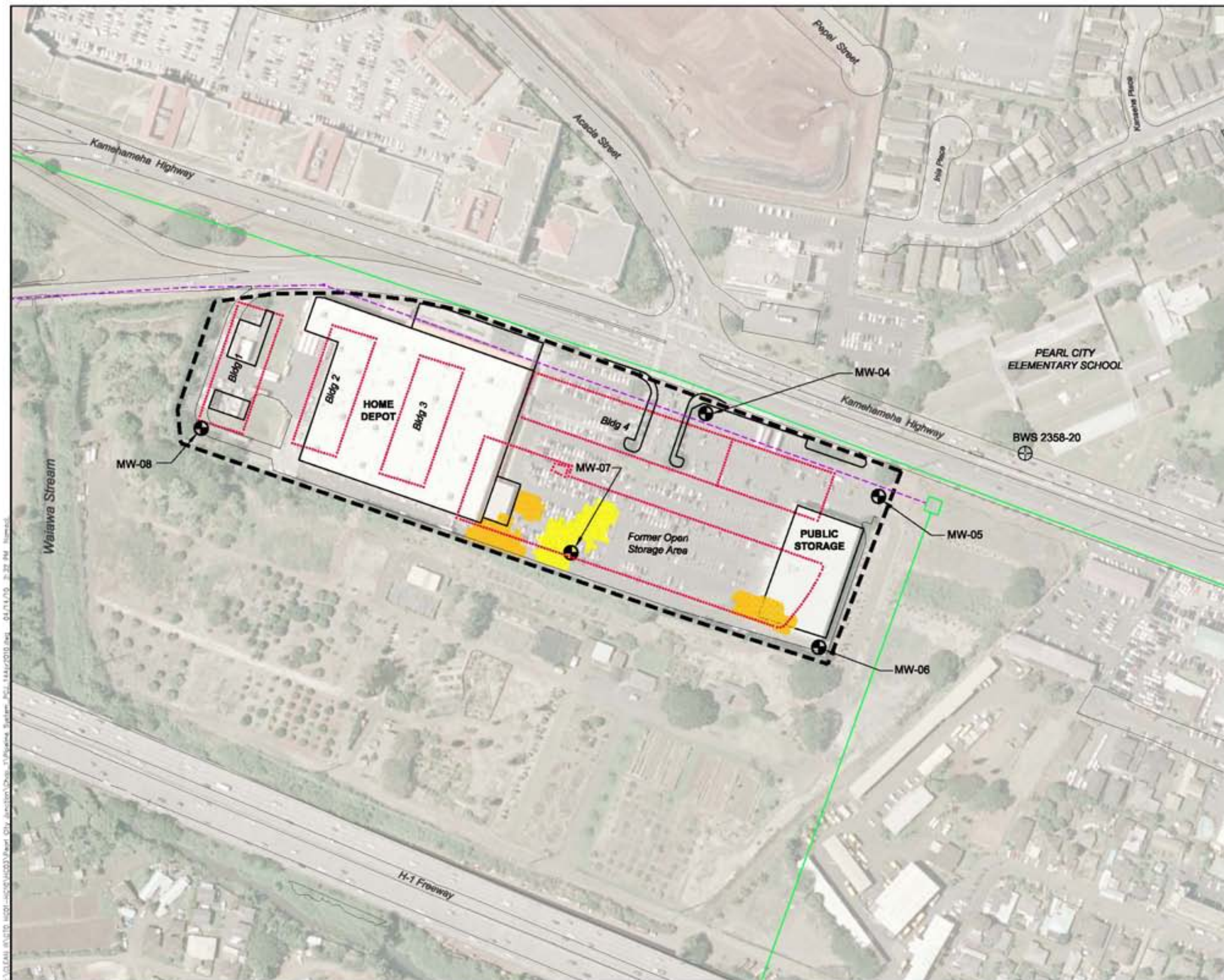


Figure 1
Site Map
Former Pearl City Junction
Oahu, Hawaii



| LEGEND | |
|----------------------|--------------------------------------------------------------|
| --- | Site Boundary |
| [Outline] | Existing Building |
| [Dashed Outline] | Former Building and Open Storage Area |
| [Yellow Hatched Box] | 1993/1994 Removal Action Area |
| [Solid Yellow Box] | 1997 Removal Action Area |
| [Well Symbol] | RGA Monitoring Well Location |
| [Well Symbol] | BWS Monitoring Well Location |
| [Dashed Line] | Removed Air Force Petroleum Pipeline (approximate location) |
| [Solid Line] | Inactive Air Force Petroleum Pipeline (approximate location) |

| SOURCES |
|----------------|
| 1. URS (2002) |
| 2. USGS (1990) |



Figure 2
Previous Removal Action Areas
Former Pearl City Junction
Oahu, Hawaii

The borings and wells installed at the Former PCJ Site extended to depths of less than 10 feet below the water table and did not encounter the basalt underlying the caprock formation; therefore, the total thickness of the caprock saturated zone cannot be accurately estimated. However, based on observations at nearby sites in similar geologic settings (i.e., the Ewa Junction Fuel Drumming Facility and Aiea Laundry Facility), the caprock saturated zone beneath the Former PCJ Site is most likely on the order of 50 feet thick. Hydraulic conductivity measurements (laboratory permeameter test results) indicate that the permeability of the caprock formation at the Former PCJ Site is very low, i.e., on the order of 10^{-8} cm/sec (Earth Tech 2003). This low permeability, combined with the high sorptive capacity of the clay-dominated caprock sediments, indicates that chemicals attributable to Navy activities at the Former PCJ Site are likely to be relatively immobile in the dissolved phase (Earth Tech 2003).

2.3.4 Conceptual Site Model

The Conceptual Site Model is a schematic representation of the chemical source areas, chemical release mechanisms, environmental transport media, potential exposure routes, and potential receptors at the site. The *Baseline Risk Assessment Report* (NEHC 1993) concluded that the Former PCJ Site posed no unacceptable risk to ecological receptors or nearby critical habitat areas; therefore, the primary purpose of the Conceptual Site Model is to represent chemical sources and exposure pathways that could result in unacceptable human health risks.

A complete exposure pathway includes the following elements:

- Sources and type of chemicals present
- Affected media
- Chemical release and transport mechanisms
- Known and potential routes of exposure
- Known or potential human and environmental receptors

The absence of any one of these elements results in an incomplete exposure pathway. Where there is no potential human exposure, there is no potential human health risk.

The Conceptual Site Model for the Former PCJ Site presented in Figure 3 identifies current and anticipated future human receptors, and evaluates potential pathways for human exposure to surface soil, subsurface soil, or groundwater. The selected final remedy for the site will ensure that the potential exposure pathways pose no unacceptable risk to current or future human receptors.

Surface Soil. The CSM evaluated the following potential mechanisms for transport and exposure to COPCs in surface soil: direct contact, air transport, bio-uptake (terrestrial and marine), stormwater runoff (drainage to sediment and discharge to the harbor). All potential pathways for human exposure to COPCs in surface soil were identified as incomplete because the soil was remediated to meet DOH requirements, and the Baseline Risk Assessment demonstrated that exposure to the surface soil poses no unacceptable risk to human health under the commercial/industrial land-use scenario (NEHC 1993). Additionally, because the site is not used for agricultural purposes, potential human exposure pathways associated with bio-uptake and ingestion of plants or animals were identified as incomplete.

Subsurface Soil. The CSM evaluated the following potential mechanisms for transport and exposure to COPCs in subsurface soil: direct contact, air transport, and bio-uptake (terrestrial). Potential pathways for exposure to subsurface soil were identified as incomplete or insignificant because

commercial/industrial land-use restrictions will prevent exposure of all current and future human receptors except future construction workers conducting excavation activities, and will require future construction contractors to implement appropriate health and safety measures during any excavation activities. Additionally, because the site is not used for agricultural purposes, potential human exposure pathways associated with bio-uptake and ingestion of plants or animals were identified as incomplete.

Groundwater. The CSM evaluated the following potential mechanisms for transport and exposure to COPCs in groundwater: direct contact, discharge of groundwater to the harbor, and bio-uptake (marine). Potential pathways for direct exposure of current and future human receptors to COPCs in the groundwater were identified as incomplete or insignificant because, as discussed in Section 2.4.2, the caprock groundwater does not represent a viable current or potential future source of potable water, and is therefore not likely to threaten human health. Potential pathways for direct exposure to Former PCJ Site COPCs in groundwater discharged to the harbor were identified as incomplete for onsite receptors because they do not contact surface water in the harbor, and as incomplete or insignificant for offsite receptors because of the long distance along the groundwater flow path between the site and the harbor (minimum of 0.75 mile).

2.4 CURRENT AND POTENTIAL FUTURE LAND AND GROUNDWATER USE

This section identifies current and potential future uses for the land and other resources (i.e., groundwater) at the site and in the surrounding area.

2.4.1 Current and Future Onsite and Surrounding Area Land Use

The current and anticipated future land use for the Former PCJ Site is commercial/industrial. The western portion of the site is owned by Home Depot, Inc., and includes a Home Depot, Inc. retail store at the west end of the site. The eastern end of the site is owned by Public Storage LLC., and includes a Public Storage facility. The CCH Department of Planning and Permitting zoning designation for the property is industrial mixed-use (IMX-1), indicating that activities other than industrial or commercial operations are not permitted at the property. The site is currently used only for commercial (retail and storage) purposes, and use of the site will be restricted to commercial or industrial activities in the future. Development or use of the property for residential housing, recreational activities, elementary or secondary school facilities, long-term care facilities, or child day care facilities will be prohibited under the current and future land use scenarios.

The land across Kamehameha Highway north of the western portion of the site is zoned as a community business district, and includes various stores, a food court, and movie theaters; a post office, elementary school, single-family houses, and multi-family complexes are also located within this area. The southwest boundary of property occupied by the Pearl City Elementary School is across Kamehameha Highway from the eastern portion of the site, approximately 200 feet to the northeast. Waiawa Stream is located approximately 250 feet west of the site; the area between the western boundary of the site and Waiawa Stream is zoned as a federal and military preservation district, and is covered by vegetation. The area immediately south and east of the site is zoned as a restricted agricultural district, and is occupied by the University of Hawaii Urban Garden Center.

2.4.2 Current and Future Groundwater Use

Although groundwater beneath the Former PCJ Site may be suitable for irrigation or other non-potable uses, it is not currently used as a source of potable water and is not expected to be used as a source of potable water in the future. The basis for this conclusion is presented in the [RGA Report](#) (Earth Tech 2003).

| Contributing Source | | | Transport Mechanism | | | Exposure Route | | | Receptors | | | | | | Rationale |
|---------------------|-----------------------------------------|----------------------------------|---------------------|------------|---------------|----------------|------------|---------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|--------------------------------|-----------------------------------|--------------------------|--------------------------------|-----------|
| | | | | | | | | | Current Land Use | | | Future Land Use | | | |
| | | | | | | | | | Industrial or Maintenance Worker | Trespasser (Adult/Child) | Offsite Resident (Adult/Child) | Industrial or Construction Worker | Trespasser (Adult/Child) | Offsite Resident (Adult/Child) | |
| Surface Soil | Direct Contact | Incidental Ingestion | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Potential pathways for human exposure to COPCs in surface soil are identified as incomplete because the soil was remediated to meet DOH requirements, and the Baseline Risk Assessment demonstrated that COPCs in surface soil no longer pose unacceptable risk to human health. Because the site is not used for agricultural purposes, potential human exposure pathways associated with bio-uptake and ingestion of plants or animals are identified as incomplete. | | | | | | |
| | | Dermal Contact | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | | Same as above. | | | | | |
| | Air Transport | Inhalation of VOCs | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Same as above. | | | | | | |
| | | Inhalation of Particulates | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Same as above. | | | | | | |
| | Bio-Uptake | Ingestion of Plants/Animals | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Same as above. | | | | | | |
| | Stormwater Runoff - Drainage Sediment | Incidental Ingestion | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Same as above. | | | | | | |
| | | Dermal Contact | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Same as above. | | | | | | |
| | Stormwater Runoff - Discharge to Harbor | Incidental Ingestion of Seawater | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Same as above. | | | | | | |
| | | Dermal Contact with Sea Water | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Same as above. | | | | | | |
| | Bio-Uptake | Ingestion of Fish/Shellfish | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Same as above. | | | | | | |
| Subsurface | Direct Contact | Incidental Ingestion | Incomplete | Incomplete | Incomplete | Insignificant | Incomplete | Incomplete | Potential pathways for exposure to subsurface soil are identified as incomplete or insignificant because commercial/industrial land-use restrictions will prevent exposure of all current and future human receptors except future construction workers conducting excavation activities, and will require future construction contractors to implement appropriate health and safety measures during any excavation activities. Because the site is not used for agricultural purposes, potential human exposure pathways associated with bio-uptake and ingestion of plants or animals are identified as incomplete. | | | | | | |
| | | Dermal Contact | Incomplete | Incomplete | Incomplete | Insignificant | Incomplete | Incomplete | | Same as above. | | | | | |
| | Air Transport | Inhalation of VOCs | Incomplete | Incomplete | Incomplete | Insignificant | Incomplete | Incomplete | Same as above. | | | | | | |
| | | Inhalation of Particulates | Incomplete | Incomplete | Incomplete | Insignificant | Incomplete | Incomplete | Same as above. | | | | | | |
| | Bio-Uptake | Ingestion of Plants/Animals | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Potential human exposure pathways associated with bio-uptake and ingestion of plants or animals are identified as incomplete because the site is not used for agricultural purposes. | | | | | | |
| Groundwater | Direct Contact | Ingestion | Incomplete | Incomplete | Insignificant | Insignificant | Incomplete | Insignificant | Potential pathways for direct exposure of current and future human receptors to COPCs in the groundwater are identified as incomplete or insignificant because the caprock groundwater does not represent a viable current or potential future source of potable water, and is therefore not likely to threaten human health. | | | | | | |
| | | Dermal Contact | Incomplete | Incomplete | Insignificant | Insignificant | Incomplete | Insignificant | | Same as above. | | | | | |
| | | Inhalation of VOCs | Incomplete | Incomplete | Insignificant | Insignificant | Incomplete | Insignificant | | Same as above. | | | | | |
| | Discharge of Groundwater to Harbor | Ingestion | Incomplete | Incomplete | Insignificant | Incomplete | Incomplete | Insignificant | Potential pathways for direct exposure to Former PCJ site COPCs in groundwater discharged to the harbor are identified as incomplete for onsite receptors because they do not contact surface water in the harbor, and as incomplete or insignificant for offsite receptors because of the long distance along the groundwater flow path between the site and the harbor (minimum of 0.75 mile). | | | | | | |
| | | Dermal Contact | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | | Same as above. | | | | | |
| | | Inhalation of VOCs | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | | Same as above. | | | | | |
| | Bio-Uptake | Ingestion of Fish/Shellfish | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Incomplete | Same as above. | | | | | | |

Figure 3
Conceptual Site Model,
Former Pearl City Junction
Oahu, Hawaii

2.5 SUMMARY OF SITE RISKS AND BASIS FOR FINAL RESPONSE ACTION

This section presents a summary of potential human health and ecological risks at the Former PCJ Site, and provides the basis for the final response action.

2.5.1 Human Health Risk Assessment Results

The *SI Report* and the *Baseline Risk Assessment Report* concluded that PCBs and dieldrin were the only chemicals detected in soil at concentrations exceeding human health target risk levels. According to the *Baseline Risk Assessment Report* (NEHC 1993), “Dieldrin and PCBs account for a majority of the future risk. Total petroleum hydrocarbons, silver, arsenic, beryllium, copper, cadmium, lead, selenium, and zinc do not pose an unacceptable risk to either present or future human and/or ecological receptors on or near the Fleet and Industrial Supply Center (FISC) site².” The *Baseline Risk Assessment Report* also concluded that removal of soil with PCB or dieldrin concentrations exceeding specified cleanup goals would reduce risk to human receptors to acceptable levels for commercial/industrial activities. The DOH concurred with the *Baseline Risk Assessment Report* conclusions and the cleanup goals specified for the site.

A human health preliminary risk evaluation (PRE) was conducted during the RGA to assess potential risks to human health associated with exposure to soil and groundwater at the Former PCJ Site (Earth Tech 2003). Reasonable maximum exposure point concentrations for surface and subsurface soil were compared to EPA Region 9 residential and industrial preliminary remediation goals (PRGs) (EPA Region 9 2002). The PRE confirmed that human health risk associated with potential exposure to surface and subsurface soil is within the acceptable range for commercial or industrial land use. The PRE results for groundwater indicated potentially unacceptable risk under the residential land use scenario and for the onsite construction worker; thus, not allowing for unrestricted use. The groundwater risk is attributable primarily to arsenic (98 percent); the remainder of the estimated risk is attributable to benzene. Although the maximum detected arsenic concentration exceeded the tap water PRG (EPA Region 9 2002), it does not exceed the current arsenic maximum contaminant level (EPA 2002). Arsenic concentrations in other caprock groundwater on Oahu are very similar to those in groundwater at the Former PCJ Site. The RGA results indicate that the arsenic detected in groundwater at the Former PCJ Site is attributable to the breakdown of natural soil and rock formations along the caprock groundwater flow path (Earth Tech 2003). The evidence therefore indicates that the arsenic detected in the Former PCJ Site caprock groundwater represents naturally occurring (background) concentrations. In addition, as discussed in Section 2.4.2, the caprock groundwater does not represent a viable current or potential future source of potable water, and is therefore not likely to threaten human health.

2.5.2 Ecological Risk Assessment Results

An ecological risk assessment (ERA) for the Former PCJ Site was completed as part of the Baseline Risk Assessment (NEHC 1993). The ERA evaluated site contamination, identified potential ecological receptors, and assessed potential exposure of ecological receptors to COPCs. The site contains vegetation and habitat characteristic of disturbed areas, and no threatened or endangered species are known to frequent the site or the surrounding area. The closest critical habitat areas are Waiawa Stream and the Waiawa Unit of the PHNWR. Because the COPCs have not migrated off site, no critical habitat areas have been impacted by site activities. The ERA concluded that chemicals attributable to past Navy operations at the site do not pose a threat to the wildlife or ecology of the site or to nearby critical habitat areas (NEHC 1993).

² The “FISC site” refers to the Former PCJ Site.

2.5.3 Basis for Final Response Action

The response action selected in this ROD is necessary to protect the public health or welfare or the environment from actual or threatened releases of hazardous substances into the environment. Soils with PCB or dieldrin concentrations exceeding the DOH-approved cleanup goals have been removed from the Former PCJ Site, thus reducing risk to industrial or commercial receptors to acceptable levels. However, additional response action is required for the site because potentially unacceptable risk to human health is associated with exposure to soil under the residential land use scenario.

2.6 PRINCIPAL THREAT WASTES

The NCP establishes an expectation that treatment will be used to address the principal threats (i.e., source material that is highly toxic and/or highly mobile) posed by a site wherever practicable. No highly toxic or highly mobile source material was identified at the Former PCJ Site; therefore, no principal threat wastes exist.

2.7 FINAL RESPONSE ACTION OBJECTIVES

The principal objectives of the final response action for the Former PCJ Site are as follows:

- Prevent development of the site for any use other than commercial or industrial activities.
- Minimize or eliminate direct human contact with or ingestion of contaminated soil.
- Prevent migration or relocation of contaminated soil to areas where human or ecological exposure could occur.

2.8 DESCRIPTION AND COMPARATIVE ANALYSIS OF RESPONSE ACTION ALTERNATIVES

This section describes the response action alternatives, the alternative evaluation process, and the alternative selected as the final remedy for the Former PCJ Site. Detailed evaluation of the response action alternatives and the rationale for recommending the alternative selected as final remedy is presented in the FFS (Earth Tech 2008).

2.8.1 Description of Response Action Alternatives

Response action alternatives are broad classes of actions that may meet the response action objectives for a site, and can include treatment, containment, excavation, extraction, disposal, institutional actions (e.g., LUCs), or a combination of these actions. The following alternatives for the final response action were evaluated in the FFS (Earth Tech 2008):

- Alternative 1: No Action
- Alternative 2: LUCs
- Alternative 3: Cleanup for Unrestricted Land Use

The activities that would be required to implement each response action alternative are summarized in Table 1.

Table 1: Activities Required for Response Action Alternatives

| Alternative 1: No Action | Alternative 2: LUCs | Alternative 3: Cleanup for Unrestricted Land Use |
|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| No remedial action, institutional controls, or engineering controls would be implemented at the site. | <p><i>Institutional Controls</i></p> <p><i>Zoning and Deed Restrictions</i> The existing IMX-1 zoning and deed restrictions would be maintained to limit future land use to commercial or industrial activities only. Environmental covenants would be enforced to prevent development or use of the property for purposes other than commercial or industrial activities, and to prohibit excavation, removal, or offsite transport of soil from within the Former PCJ Site boundaries, unless the soil meets all applicable regulations and standards or prior written approval is obtained from the EPA and DOH.</p> <p><i>Notifications of Institutional Controls</i> All decision documentation and requirements for implementing and maintaining the LUCs would be reviewed by the public and maintained in the Administrative Record file for the site. Once agreed upon, the environmental covenants would be recorded and maintained under the Uniform Environmental Covenants Act (UECA), Hawai'i Revised Statutes (HRS) Chapter 508C to ensure that all current and subsequent owners of the property are informed of and remain in compliance with the institutional control conditions.</p> <p><i>Engineering Controls</i> Soil removed from future excavations required to repair or replace subsurface utilities would be used as backfill in the utility excavations. If offsite disposal of excess soil is required, the soil would be sampled for chemical analysis to evaluate disposal alternatives. Construction contractors would implement appropriate health and safety measures to protect workers during excavation and construction activities that may encounter soil containing COPCs at concentrations that could pose unacceptable risks to human health.</p> | <p>Portions of the asphalt pavement in the parking lot and the concrete foundations of the Home Depot and Public Storage buildings would be removed as necessary to access underlying soil with chemical concentrations above cleanup goals based on risk-based criteria for residential soil or background metal concentrations.</p> <p>Standard earth-moving equipment (e.g., backhoe, excavator, front-end loader) would be then be used to excavate soil with chemical concentrations above the cleanup goals.</p> <p>Confirmation soil samples would be collected from the base and sides of each excavation and analyzed to verify that chemical concentrations in soil that remains in place at the site are less than the cleanup goals.</p> <p>Excavated soil would be tested in accordance with the requirements of the receiving solid waste landfill facility.</p> <p>Contaminated soil would be transported to a CERCLA-approved landfill on the U.S. mainland for disposal.</p> <p>The excavated areas would be backfilled with clean soil, and the asphalt pavement and concrete floors would be restored.</p> |

2.8.1.1 ALTERNATIVE 1: NO ACTION

Under Alternative 1, no action would be conducted to remediate or contain residual contamination, and the Former PCJ Site would be allowed to remain in its current state with no access restrictions, institutional controls, or engineering controls. The NCP (40 CFR 300.430[e][6]) requires evaluation of the no action response action alternative to provide a baseline for comparison to the other alternatives.

2.8.1.2 ALTERNATIVE 2: LAND USE CONTROLS

Institutional controls, as defined by Department of Defense (DoD) policy on LUCs for environmental restoration activities (DoD 2001), are any type of physical, legal, or administrative mechanism that restricts the use of, or limits access to, real property to prevent or reduce risks to human health and the environment. Physical mechanisms encompass a variety of engineered remedies to contain or reduce contamination or physical barriers to limit access to property, such as fences and signs. Legal and administrative mechanisms are enforced to ensure the continued effectiveness of land use restrictions imposed as part of a response action. Examples of legal and administrative controls include easements, covenants, equitable servitudes, notices (in the deed or in local newspapers), zoning, educational materials, permits (such as construction, well drilling, and excavation permits), and agreements with regulators.

Under Alternative 2: Land Use Controls, the existing IMX-1 zoning designation would be maintained, and environmental covenants for the Former PCJ property would be agreed upon by current landowners and then recorded and maintained on official State of Hawaii land records under the Uniform Environmental Covenants Act (UECA), Hawaii Revised Statutes (HRS) Chapter 508C. As indicated in the *Technical Guidance Manual for the Implementation of the Hawai'i State Contingency Plan* (DOH 2009b), the UECA was enacted in July 2006 to provide a regulatory mechanism for ensuring that all current and subsequent property owners are informed of and remain in compliance with institutional control conditions specified in environmental covenants.

Soil removed from future excavations required to repair or replace subsurface utilities would be used as backfill in the utility excavations. If offsite disposal of excess soil is required, the soil would be sampled for chemical analysis to evaluate disposal alternatives. Construction contractors would implement appropriate health and safety measures to protect workers during excavation and construction activities that may encounter soil containing chemicals at concentrations that could pose unacceptable risks to human health.

5-year reviews and long-term monitoring would be conducted to ensure that the LUC mechanisms remain in place for as long as necessary to protect human health. The five-year reviews and long-term monitoring would confirm that the zoning and land use are consistent with the LUC restrictions and limitations, and engineering controls remain in place.

2.8.1.3 ALTERNATIVE 3: CLEANUP FOR UNRESTRICTED LAND USE

Alternative 3: Cleanup for Unrestricted Land Use would be accomplished by excavating soil with COPC concentrations above human health risk-based criteria for residential receptors based on the EPA Regional Screening Levels for Chemical Contaminants at Superfund Sites (EPA 2009) and/or background metal concentration ranges (Earth Tech 2006), and disposing of the soil in a CERCLA-approved facility. COPC concentrations reported for soil and groundwater samples collected during the investigations and removal actions are listed in [Appendix A](#) of the FFS. Contaminated soil removed from the site would be transferred to a CERCLA-approved solid waste landfill on the U.S. mainland, where it would be contained in cells designed to restrict contaminant mobility.

The FFS documents the assumptions used to estimate the amount of soil that would require removal under Alternative 3: Cleanup for Unrestricted Land Use, and identifies the estimated boundaries of the excavation areas. The total surface area within the estimated excavation boundaries was approximately 61,800 square feet (ft²). Based on the depth of COPC detections at the SI and Baseline Risk Assessment delineation sampling locations (generally between 0.5 and 1.0 foot) and the verification sampling data collected during the previous removal actions, an average depth of 2.0 feet was considered reasonable for estimating requirements for removal of soil with

concentrations above screening criteria for unrestricted (residential) use. Based on the average depth (2.0 feet) and the approximate area within the estimated excavation areas (61,800 ft²), the volume of contaminated soil that would require removal under Alternative 3 was estimated at 4,600 cubic yards (Earth Tech 2008).

2.8.2 Analysis of Response Action Alternatives

2.8.2.1 EVALUATION CRITERIA

The response action alternative analysis was based on the nine criteria specified by the NCP (40 CFR 300.430[e][a][iii]) and EPA guidance for conducting remedial investigations and feasibility studies under CERCLA (EPA 1988). The NCP criteria are listed in Table 2.

Table 2: NCP Criteria for Analysis of Response Action Alternatives

| Criterion | Application of Criterion and Rating on 5-Tiered Scale |
|--------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Threshold Criteria | |
| Overall Protectiveness of Public Health and the Environment | Application: Assesses the ability of an alternative to eliminate, reduce, or control the risks associated with exposure pathways, including direct contact, potential migration, and risks to ecosystems. Rating: Excellent if highly protective. Poor if not protective. |
| Compliance with ARARs | Application: Evaluates the potential of an alternative to comply with chemical-, location-, and action-specific ARARs and TBC criteria. Rating: Excellent if compliant. Poor if non-compliant. |
| Primary Balancing Criteria | |
| Long-Term Effectiveness and Permanence | Application: Measures the ability of an alternative to permanently protect human health and the environment. Rating: Excellent if highly effective. Poor if not effective. |
| Reduction of Toxicity, Mobility, or Volume Through Treatment | Application: Evaluates the ability of an alternative to permanently or significantly reduce the toxicity, mobility, or volume of the constituents through treatment. Rating: Excellent if reduces all contaminants of concern. Poor if no reduction. |
| Short-Term Effectiveness | Application: Assesses the capability of an alternative to protect human health and the environment during implementation of a response action. Rating: Excellent if highly effective. Poor if not effective. |
| Implementability | Application: Evaluates technical feasibility and the difficulty of applying the alternative at the site, the reliability of the technology, the unknowns associated with the alternative, and the need for treatability studies. Assesses administrative requirements, including regulatory agency approval, permits and waivers, mobilization needs, accessibility of equipment, and availability of trained personnel required to implement the alternative. Rating: Excellent if highly feasible and available. Poor if not feasible and available. |
| Cost | Application: Assesses the capital, operation, and maintenance costs of each alternative. Rating: Excellent if < \$1 Million. Poor if >\$4 Million. |
| Modifying Criteria | |
| Regulatory Agency Acceptance | Application: Evaluates the likelihood of approval by the regulatory agencies. Rating: Excellent if highly acceptable. Poor if not acceptable. |
| Public acceptance | Application: Assesses the anticipated level of acceptance by the public. Rating: Excellent if highly acceptable. Poor if not acceptable. |
| TBC to be considered | |

The first two criteria (i.e., overall protection of human health and the environment, and compliance with ARAR and to be considered [TBC] criteria) are threshold criteria representing the statutory requirements that a response action must achieve in order to comply with CERCLA requirements. The next five criteria (i.e., long-term effectiveness and permanence; reduction in toxicity, mobility, or volume through treatment; short-term effectiveness; implementability; and cost) are the primary balancing criteria upon which selection of a response action is based. Together, these first seven

criteria are considered evaluation criteria; the final two criteria (i.e., state and public acceptance) are considered modifying criteria.

The following sections compare the relative performance of each response action alternative with respect to the NCP criteria to identify the most appropriate final remedy for the Former PCJ Site.

2.8.2.2 DETAILED ANALYSIS OF ALTERNATIVES

Each response action alternative was evaluated against the NCP criteria listed in Table 2 and rated for general effectiveness, implementability, and cost. The ratings for each alternative were then compared to assess their relative performance and identify the most appropriate final remedy. A summary of the response action alternative analysis is presented in Table 3.

The cost estimates for Alternative 2: Land Use Controls, and Alternative 3: Cleanup for Unrestricted Land Use were developed using the DoD cost estimating software program *Remedial Action Cost Engineering and Requirements* (RACER), which bases cost estimates on historical cost averages for individual remedial activities, adjusted for typical cost variations within the general region of the subject site. Real costs based on similar projects were used where appropriate (e.g., costs for work plan development and travel).

RACER cost estimate documentation reports and the estimated total costs for Alternative 2: Land Use Controls, and Alternative 3: Cleanup for Unrestricted Land Use are presented in Attachment C. Estimated costs for these alternatives based on the 2004 RACER cost estimating database were previously presented in [Appendix B](#) of the FFS (Earth Tech 2008). The cost estimates have been revised to reflect the most accurate estimates for each cost item based on the most recent (2010) RACER cost estimating database and the latest version of the RACER program (version 10.3.0). The revised estimated total cost for Alternative 3 (\$8,057,000) is substantially higher than the previous estimate (\$5,535,000) due to increases in costs of the materials and services required to excavate and dispose of the contaminated soil and restore the site to conditions that would allow for unrestricted land use. However, the revised estimated total cost for Alternative 2 (\$245,000) is substantially lower than the previous estimate (\$1,249,000); the lower estimated cost for this alternative reflects a refined analysis of the specific tasks that would be required to implement the LUCs and conduct the 5-year reviews as required under CERCLA, and use of the LUC model in the latest version of RACER.

2.9 SELECTED FINAL REMEDY

Alternative 1: No Action does not meet the Threshold Criteria (Overall Protectiveness of Public Health and the Environment and Compliance with ARARs). Alternative 2: LUCs and Alternative 3: Cleanup for Unrestricted Land Use are therefore the only acceptable response action alternatives. However, the implementability and cost-effectiveness of Alternatives 2 and 3 differ markedly. The LUC alternative is preferable because of its technical and administrative feasibility, cost-efficiency, and compatibility with the current and anticipated future use of the land (commercial). Cleanup to unrestricted land use is not preferable because it is neither technically feasible nor cost effective and is not required under the current or potential future land use scenario. The Navy and EPA, with concurrence from the DOH, recommend that LUCs serve as the final remedy for the Former PCJ Site (Section 1.7).

Table 3: Response Action Alternative Analysis

| Criterion | Response Action Alternatives | | |
|--------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | No Action | LUCs | Cleanup for Unrestricted Land Use |
| Effectiveness | | | |
| Overall protection of human health and the environment | Would not remove contaminated soil from the site or eliminate exposure pathways. Could pose risks to human health and the environment because contaminated soil would remain at the site and no controls would be in place to eliminate exposure pathways or restrict future land use to commercial or industrial activities only. | Would not remove contaminated soil from the site, but would provide institutional and engineering controls to prevent exposure to the soil and protect human health and the environment under the commercial or industrial land use scenario. | Would remove contaminated soil from the site and eliminate exposure pathways. Confirmation sampling would verify attainment of the cleanup goals. Soil would be disposed of at a facility approved to contain CERCLA wastes. Landfill disposal presents little or no human health or environmental risk because engineering controls are used to contain the waste and contingencies are in place to minimize and properly respond to a release. |
| Compliance with ARARs | Would not comply with ARARs because this alternative would not remove or prevent exposure to soil with COPC concentrations above levels that could pose risks to human health and the environment under the unrestricted land use scenario. | Would comply with ARARs. Although residual contamination remains in soil at the site, risk assessment conclusions and soil removal verification sampling and analysis results indicate that COPC concentrations in the soil are below levels that would pose unacceptable risk to human health or the environment under the commercial or industrial land use scenario. | Would comply with ARARs because soil that could pose risks to human health or the environment under the unrestricted use scenario would be removed from the site, and disposed of at a landfill approved to accept CERCLA remediation wastes. |
| Long-term effectiveness and permanence | Would not provide an effective or final response action for the site. | Would provide a final response action for the site if LUCs are maintained as required. After implementation of the deed restrictions, periodic monitoring of the LUCs would be required to ensure long-term maintenance of the deed restrictions. | Would provide a final response action for the site. Long-term containment effectiveness and permanence would be achieved by removing and disposing of soil with COPC concentrations above levels that could pose risks to human health or the environment under the unrestricted use scenario in a CERCLA-approved landfill facility. However, offsite disposal can incur long-term liability, and the landfill must meet monitoring, maintenance, closure, and post-closure requirements. |
| Reduction in toxicity, mobility, or volume through treatment | Would not reduce toxicity, mobility, or volume of COPCs through treatment. | Mobility of the COPCs is limited by the asphalt and concrete surfaces that cover the site. However, this alternative would not achieve reduction in toxicity, mobility, or volume through treatment. | Neither toxicity nor volume would be reduced. Mobility would be reduced by the liner, cap, and leachate collection systems at a CERCLA-approved landfill facility. However, because offsite disposal is not considered treatment, this alternative would not achieve reduction in toxicity, mobility, or volume through treatment. |
| Short-term effectiveness | Would not involve short-term physical disturbances. Air emissions and erosion would not require control. | Would not involve short-term physical disturbances. Air emissions and erosion would not require control. | Contaminated soil could pose risks to onsite workers and offsite receptors due to accidental releases during excavation and transport. However, these potential risks would be minimized through proper training (e.g., in accordance with 29 CFR 1910), proper use of engineering controls (e.g., dust suppression, decontamination), and personal protective equipment (e.g., gloves, disposable overalls). Temporary erosion control measures would prevent migration of contaminated soil to surrounding areas. |
| Implementability | | | |
| Technical feasibility | Because no action is required, technical feasibility is not an issue for this alternative. | This is a proven alternative that could be readily implemented. | The technical feasibility of this alternative is limited by the technical difficulty involved in removing and reconstructing portions of the concrete foundations under the Home Depot and Public Storage buildings. |
| Administrative feasibility | The EPA, DOH, and the public are not likely to approve of a no action decision for the site. | The EPA, DOH, and the public are likely to approve a permanent deed restriction limiting future use of the site to commercial or industrial activities only. | Activities required to implement this alternative would be subject to numerous administrative requirements (e.g., permitting for demolition, excavation, disposal, and reconstruction activities). No CERCLA-approved landfill exists on Oahu. Disposal at a CERCLA-approved landfill would require shipment to the U.S. mainland, and transport and disposal permits. The landfill facility must use proper engineering controls and follow monitoring, maintenance, closure, and post-closure requirements. |
| Availability of services and materials | No services or materials are required to implement this alternative. | The limited services and materials required to implement this alternative are readily available. | Excavation equipment and operators are readily available. Off-island transport and disposal would require logistical effort. |
| State acceptance | State (i.e., DOH) acceptance is not likely because this alternative would not mitigate potential risks to human health or the environment. | State (i.e., DOH) acceptance is considered likely because this alternative would provide adequate protection of human health and the environment, and comply with ARARs. | State (i.e., DOH) acceptance is considered likely because this alternative would provide adequate protection of human health and the environment, and comply with ARARs. However, the state is not likely to request implementation of this alternative because the current and planned future land use for the site is commercial. |
| Public acceptance | Public acceptance is not likely because this alternative would not mitigate potential risks to human health or the environment. | Public acceptance is considered likely because this alternative would provide adequate protection of human health and the environment, and comply with ARARs. | Public acceptance is considered likely because this alternative would provide adequate protection of human health and the environment, and comply with ARARs. However, the demolition, excavation, and reconstruction activities would disrupt the ongoing commercial activities at the site, resulting in inconvenience to the public. |
| Cost | | | |
| Estimated Capital and O&M costs ^a | No capital or O&M costs are associated with this alternative. | Capital cost: \$245,000 Costs for maintaining the commercial or industrial facilities at the site (by the facility owners) are not included in the estimated cost for this alternative. | Capital cost: \$8,057,000 No O&M costs are associated with this alternative. |

O&M operation and maintenance
^a Detailed cost estimates are presented in Attachment C.

The LUCs will ensure that the residual soil contamination at the Former PCJ Site does not pose unacceptable risks to human health or the environment under the current and projected future land use scenario (commercial use). The Navy has determined that the previously completed cleanup actions reduced risks at the Former PCJ Site to levels acceptable for protecting human health and the environment if the LUCs are maintained. The LUCs will comply with all ARARs and will be maintained until the concentrations of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and unlimited exposure. The boundary of the LUC area will encompass all portions of the site where investigation results indicate that chemical concentrations in soil exceed levels that would allow for unrestricted land use and unlimited human exposure.

LUCs will fulfill the response action objectives by:

- Prohibiting unauthorized digging, disturbance of site soil, or any other land modifications that could potentially expose contaminated soil
- Prohibiting excavation and removal of site soil to an offsite location unless the soil meets all applicable regulations and standards or prior written approval is obtained from the EPA and DOH
- Prohibiting development or use of the property for residential housing, recreational activities, elementary or secondary school facilities, long-term care facilities, or child day care facilities

The existing IMX-1 zoning designation will be maintained, and covenants that restrict land use to commercial or industrial; provide notice of the remaining site contamination; prohibit unauthorized excavation, removal, or offsite transport of soil; and ensure the Navy's right of access for purposes of monitoring, inspection, and further response action (if necessary) will be placed in official State of Hawaii land use registries. The environmental covenants for the Former PCJ property will be recorded and maintained on official records under the UECA (HRS Chapter 508C).

An *Environmental Agreement and Modification of Reserved Access Right* between the Navy and Home Depot, Inc. was executed on 25 June 1999 (Latham & Watkins 1999). As indicated in Section 2 of the agreement, "Home Depot covenants and agrees that the Property shall not be used for residential purposes or for long-term health care or educational facilities for persons under 21 years of age without prior written consent of the Navy." Section 2 of the agreement also indicates that "If Home Depot engages in or undertakes to use the Property for any such purposes as require consent hereunder, then Home Depot will perform or cause to be performed any environmental remediation to the extent that such remediation is required solely to remediate hazardous substances at the Property which are present at levels which satisfy industrial cleanup standards but not residential cleanup standards, and to the extent necessary to permit utilization of the Property for purposes other than commercial or industrial uses, and uses incidental thereto."

The Navy will prepare a *RAWP* to specify the institutional and engineering controls required to implement LUCs as the final remedy for the Former PCJ Site and submit the *RAWP* for EPA review and approval within 90 days of ROD signature. The *RAWP* will describe how the LUCs will be implemented and maintained, and will provide the requirements for periodic inspections, 5-year reviews, and long-term monitoring. Long-term monitoring and reporting will be required to ensure that the LUCs remain protective at the Former PCJ Site over time. The LUCs will be maintained through appropriate environmental covenants which the Navy intends to obtain through agreements with current landowners. Once agreed upon, the environmental covenants will be publicly recorded in the State of Hawaii, Bureau of Conveyances. Implementation of LUCs will be confirmed by annual inspections performed by the Navy or property owner. Although the Navy may later transfer

these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Navy will retain ultimate responsibility for remedy integrity.

The Navy is responsible for implementing, maintaining, reporting on, and enforcing the LUCs. This may be modified to include another party if warranted by site-specific circumstances. The Navy will implement internal procedures for upholding the LUCs by maintaining a database of the LUCs (i.e., the Naval Installation Restoration Information Solution). The Navy will notify the EPA in advance of any changes to internal procedures that would affect the LUCs.

LUCs will be maintained at the Former PCJ Site until concentrations of hazardous substances in the soil are at such levels as to allow for unrestricted land use and exposure. 5-year reviews are required for all CERCLA response actions that leave contaminants in place at concentrations above levels that allow for unlimited land use and unrestricted exposure. Because PCBs and dieldrin remain in soil at such concentrations, the Navy will perform 5-year reviews to ensure that the final remedy remains effective as long as required to prevent unacceptable risk potentially associated with exposure to contaminated soil or groundwater.

2.9.1 Land Use Control Performance Objectives

Performance objectives for the LUCs include the following:

- Prevent development of the site for any use other than commercial or industrial activities.
- Minimize or eliminate direct human contact with or ingestion of contaminated soil.
- Provide adequate notice of the presence of contaminated soil to users, workers, and any potential landowners.
- Prevent unauthorized excavation, uncontrolled soil removal, and construction and prevent migration or relocation of contaminated soil to areas where human or ecological exposure could occur.

The Navy will implement internal procedures for upholding LUCs by maintaining a database to track the LUCs (i.e., Naval Installation Restoration Information Solution). The Navy will notify the EPA in advance of any changes to the internal procedures that would affect the LUCs.

2.9.1.1 ESTIMATED COST OF THE SELECTED FINAL REMEDY

The estimated cost of the selected final remedy, including legal and administrative costs, is \$245,000. The RACER cost estimate documentation report for the selected final remedy is presented in Attachment C.1.

2.9.1.2 EXPECTED OUTCOMES OF THE SELECTED FINAL REMEDY

The selected final remedy for the Former PCJ Site will reduce potential future human health risks associated with contaminated soil by preventing exposure to soil that could pose unacceptable risks under the current or potential future land-use scenarios. Site use will remain restricted to commercial/industrial use only. The caprock groundwater underlying the Former PCJ Site is not currently used as a source of potable water and site-specific hydrogeologic factors, along with relevant federal and state regulations and guidance, indicate that the groundwater will not be developed as a potable water source in the future. The final remedy does not change the current or planned future land or groundwater use. The final remedy does not reduce the toxicity or volume of waste or contaminants at the site, and requires that restrictive LUCs be implemented because site conditions will not be compatible with unrestricted land use.

2.9.2 Statutory Determinations

Executive Order 12580 authorizes the Navy to conduct environmental cleanup and remediation activities at Navy sites. Therefore, the Navy is the lead agency for the Former PCJ Site. The Navy has determined that the selected final remedy will ensure protection of human health and the environment and compliance with ARARs, as required under CERCLA.

2.9.2.1 PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

The Baseline Risk Assessment concluded that the COPCs detected at the site do not pose a threat to the wildlife or ecology of the site or to nearby critical habitat areas (NEHC 1993); therefore, the selected final remedy focuses on exposure pathways that could pose unacceptable risk to human receptors. Because the Air Force will characterize and, if necessary, remediate the fuel-related chemicals detected in subsurface soil and groundwater near MW-04 and MW-05, the final remedy is designed to eliminate potentially unacceptable risk to human health associated with exposure to soil containing PCBs, dieldrin, or metals at concentrations above levels that would allow for unrestricted use of the Former PCJ Site.

2.9.2.2 COMPLIANCE WITH APPLICABLE OR RELEVANT AND APPROPRIATE REQUIREMENTS

According to Navy Policy, all ER Program response actions must be consistent with the CERCLA of 1980, as amended by the SARA of 1986 (EPA 1986) (42 United States Code §§ 9601-9675) and the NCP (40 CFR 300.430(e)(6)). CERCLA and the NCP require that response actions comply with the ARARs of federal laws or more stringent promulgated laws. Because ARARs do not exist for every chemical or circumstance, non-promulgated federal advisories, criteria, or guidance materials (TBC criteria) may help determine what is protective of a site and how to carry out certain actions or requirements. The NCP does not require agencies to follow TBC criteria, but suggests TBC criteria be used when ARARs do not exist or when ARARs alone would not adequately protect human health and the environment.

The EPA has identified three broad classifications of ARARs and TBC criteria:

1. *Chemical-specific*: establish numerical standards limiting the concentration of substances in the media of concern or media affected by the selected response action. These values establish the acceptable amount or concentration of a chemical that may be found in or discharged to the ambient environment to protect against unacceptable risks to human health and the environment.
2. *Location-specific*: restricts the concentration of a substance or the conduct of the selected response action on the basis of site location.
3. *Action-specific*: technology- or activity-based restrictions controlling the performance and design standards of a selected response action. (No action-specific ARARs were identified for the Former PCJ Site because the selected final remedy does not involve soil excavation, treatment, or other actions that would require technology- or activity-based restrictions).

The ARAR and TBC criteria identified for the selected final remedy are summarized in Table 4. Detailed discussions of the ARAR and TBC criteria that were considered to evaluate the response action alternatives and select the final remedy are presented in the FFS (Earth Tech 2008).

Table 4: ARAR and TBC Criteria for the Selected Final Remedy

| Source of Authority | Requirement, Standard, or Criterion | Type | Description | Remarks |
|--------------------------------------------------------|----------------------------------------------------------------------------------------|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Chemical-Specific Criteria | | | | |
| EPA Region 9 SSLs (2005) | SSLs (EPA Migration Guidelines) | TBC | SSLs are used to estimate the potential for migration of chemicals from soil to groundwater. | SSLs were identified as chemical-specific TBC criteria for the selected final remedy. |
| Tier 1 EALs (DOH 2009a) | Tier 1 EALs for soil and non-drinking water groundwater >150 meters from surface water | TBC | Tier 1 EALs are conservative chemical-specific criteria for evaluating potential long-term threats to human health and the environment. | Tier 1 EALs for soil and groundwater that is not a potential drinking water source and >150 meters from surface water were identified as chemical-specific TBC criteria for the selected final remedy. |
| Baseline Risk Assessment (NEHC 1993) | Human Health Risk Assessment Levels of Concern | TBC | The risk assessment results were used to establish cleanup goals for the soil removal actions at the site. | Human health risk-based criteria were identified as chemical-specific TBC criteria for the selected final remedy. |
| Location-Specific Criteria | | | | |
| Hawaii Revised Statutes (HRS §§ 508C-1 <u>et seq</u>) | Uniform Environmental Covenants Act (UECA) | Relevant and Appropriate | The UECA requires an environmental covenant to ensure that the selected remedy remains in effect if the property is transferred to a private party. | The UECA was identified as a location-specific ARAR criterion because it is relevant and appropriate to the selected final remedy. |
| EAL | environmental action level | | | |
| SSL | soil screening level | | | |
| UECA | Uniform Environmental Covenants Act | | | |

2.9.2.3 COST-EFFECTIVENESS

The response action alternative selected as the final remedy for the Former PCJ Site is cost-effective and represents a reasonable value for the required public funds.

2.9.2.4 UTILIZATION OF PERMANENT SOLUTIONS AND ALTERNATIVE TREATMENT TECHNOLOGIES

The selected final remedy represents the maximum extent to which a permanent solution can be implemented in a cost-effective manner. Specifically, this alternative provides the best short- and long-term effectiveness, is protective of human health and the environment, complies with ARARs, achieves the response action objectives, reduces contaminant mobility, and is technically feasible. Details of the response action alternative evaluation are presented in the FFS (Earth Tech 2008).

2.9.2.5 PREFERENCE FOR TREATMENT AS A PRINCIPAL ELEMENT

The selected final remedy does not satisfy the statutory preference for treatment as a principal element of the final remedy. The NCP [Section 300.430(a)(1)(iii)(A)] establishes the expectation that treatment will be used to address the principal threats at a site where practicable. A principal threat waste is source material with toxicity and mobility characteristics that combine to pose a potential risk greater than the risk level that is acceptable under the current or future exposure scenarios. As discussed in Section 2.6, there are no principal threat wastes at the Former PCJ Site; therefore, treatment is not required as a principal element of the final remedy.

2.9.2.6 FIVE-YEAR REVIEW REQUIREMENT

The selected final remedy will allow contaminants to remain on site at concentrations could pose unacceptable risk if unlimited use and unrestricted exposure are allowed; therefore, 5-year reviews

will be required to ensure that the final remedy continues to be protective of human health and the environment.

2.9.3 Documentation of Significant Changes

The PP (DON 2009) identified LUCs as the final remedy selected for the Former PCJ Site. The PP was released for public comment on 22 February 2009, and a public meeting to present and discuss the PP was held on 5 March 2009. The Navy received no comments on the PP from the public; therefore, no significant changes have occurred.

2.10 COMMUNITY PARTICIPATION

The Navy has encouraged public participation in the decision process for environmental response actions at the Former PCJ Site throughout the environmental restoration and site closure processes. A Restoration Advisory Board (RAB) composed of the DOH, EPA, Navy, and community representatives was established to ensure public involvement in the decision-making process. The Navy has issued fact sheets that summarize the site investigation and cleanup activities. The RAB team has provided review and comment leading to the selection of the final remedy in this ROD. The Navy has also established a point-of-contact for the public.

The Navy prepared the PP to summarize the background and characteristics of the site, explain the findings of the human health and environmental risk assessments, describe the cleanup objectives and remedial alternatives considered for the site, and present the rationale for recommending the alternative selected as the final remedy. A public meeting to present the PP was held on 5 March 2009 at the Pearl City Highlands Elementary School.

Fact sheets and other project documents, including work plans, technical reports, and other materials relating to the Former PCJ Site investigation and cleanup activities, are available in the information repositories at the following addresses:

Pearl City Library
1138 Waimano Home Road
Pearl City, Hawaii 96782
(808) 453-6566

Hamilton Library at the University of Hawaii at Manoa
Hawaiian and Pacific Collection
2550 McCarthy Mall
Honolulu, Hawaii 96822
(808) 956-8264

Additional project information is located in the Administrative Record file located at NAVFAC Pacific in Pearl Harbor. The address for the Administrative Record file is provided below:

Naval Facilities Engineering Command, Pacific
258 Makalapa Drive, Suite 100
Attn: NAVFAC PAC EV4
Pearl Harbor, Hawaii 96860-3134

3. Responsiveness Summary

Public notices announcing the availability for review of the PP (DON 2009) and other project related documents were printed in the *Honolulu Advertiser* and *Honolulu Star-Bulletin* on 22 February 2009 and 15 March 2009. A 32-day public comment period for the PP was held from 22 February 2009 to 26 March 2009, and a public meeting to discuss the PP was held on 5 March 2009 at the Pearl City Highlands Elementary School. No community representatives attended the meeting and the Navy received no comments on the PP from the public.

3.1 STAKEHOLDER ISSUES AND LEAD AGENCY RESPONSES

The Navy and EPA Region 9, with DOH concurrence and the approval of EPA Headquarters, have selected LUCs as the final remedy for the Former PCJ Site.

3.2 TECHNICAL AND LEGAL ISSUES

Potential technical and legal issues for the selected final remedy consist of implementation of the LUCs, including restrictions on future land use. The Navy is responsible for ensuring long-term protection of human health and the environment at the site, and is committed to implementing the final remedy as required to achieve this objective. The land owner will be responsible for compliance with the conditions of the LUCs. Any activities conducted at the Former PCJ Site that might have impact on the integrity of the ground cover materials will require approval from the Navy and EPA, and concurrence from the DOH. The Navy will retain ultimate responsibility for the long-term integrity of the final remedy.

4. References

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Attachment A
Portable Document Format Hyperlink Index Table

Portable Document Format Hyperlink Index Table

| Item | Reference Phrase in ROD | Location in ROD | Identification of Referenced Document Available in the Administrative Record |
|------|-----------------------------------------------------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1 | Federal Facilities Agreement (FFA) for the Pearl Harbor Naval Complex | Section 1.2, page 1-1 | Federal Facility Agreement Under CERCLA Section 120, in the matter of: The U.S. Department of the Navy, Pearl Harbor Naval Complex, Oahu, Hawaii. Administrative Docket Number 94-05, EPA Region 9, State of Hawaii, and DON, March 1994. |
| 2 | Focused Feasibility Study | Section 1.6, page 1-2 | Revised Focused Feasibility Study for Pearl City Junction, Pearl City, Oahu, Hawaii, Executive Summary, Earth Tech, April 2008. |
| 3 | Proposed Plan | Section 1.6, page 1-2 | Proposed Plan for Pearl City Junction, Pearl City, Oahu, Hawaii, February, DON, February 2009. |
| 4 | Environmental Baseline Survey for Transfer | Section 2.1, page 2-1 | Environmental Baseline Survey for Transfer for Pearl City Junction Site, Fleet and Industrial Supply Center, Pearl City, Hawaii, Pearl Harbor, Hawaii, Ogden, March 1994. |
| 5 | Finding of Suitability to Transfer | Section 2.1, page 2-1 | Finding of Suitability to Transfer, Pearl City Junction Site, Fleet Industrial Supply Center, Pearl City Hawaii, pages 1-2, DON, May 1994. |
| 6 | Environmental Agreement and Modification of Reserved Access Right | Section 2.1, page 2-1 | Environmental Agreement and Modification of Reserved Access Right, Pearl City Junction Storage Area, Department of the Navy and Home Depot U.S.A., Latham & Watkins, June 1999. |
| 7 | risks associated with human and environmental exposure | Section 2.2.1.3, page 2-2 | Baseline Risk Assessment for Pearl City Junction Fleet and Industrial Supply Center, Pearl Harbor, Pearl City, Hawaii Volume 1a Technical Report, Section 4, NEHC, August 1993. |
| 8 | Conceptual Site Model Summary Diagram | Section 2.2.1.4, page 2-3 | Regional Groundwater Assessment, Manana Storage Area and Pearl City Junction, Pearl City, Oahu, Hawaii, Section 6.5, Earth Tech, March 2003. |
| 9 | nature and extent of soil and groundwater contamination | Section 2.2.1.5, page 2-3 | Final Remedial Investigation at ST18A, Hickam POL Site, Oahu, Hawaii, Section 4, TEC, August 2007a. |
| 10 | backfilled with clean soil | Section 2.2.2.1, page 2-4 | Closure Report, Dieldrin Removal Near Building 4, Pearl City Junction, Fleet and Industrial Supply Center, Pearl Harbor, Hawaii, Section 7, OHM, September 1994. |
| 11 | Action Memorandum | Section 2.2.2.1, page 2-4 | Action Memorandum: Dieldrin Removal Near Bldg. 4, Pearl City Junction (PCJ), FISC, Pearl Harbor, Pearl Harbor, Hawaii: PACNAVFACENGCOM, DON, August 1993. |
| 12 | post excavation verification | Section 2.2.2.2, page 2-4 | Final Remediation Verification Report, Polychlorinated Biphenyl-Contaminated Soil Removal, Pearl City Junction, Oahu, Hawaii, OHM, Section 4, August 1999. |
| 13 | RGA Report | Section 2.3.2, page 2-5 | Regional Groundwater Assessment, Manana Storage Area and Pearl City Junction, Pearl City, Oahu, Hawaii, Section 3.3, Earth Tech, March 2003. |
| 14 | RGA Report | Section 2.3.3, page 2-5 | Regional Groundwater Assessment, Manana Storage Area and Pearl City Junction, Pearl City, Oahu, Hawaii, Section 3.3, Earth Tech, March 2003. |
| 15 | RGA Report | Section 2.4.2, page 2-12 | Regional Groundwater Assessment, Manana Storage Area and Pearl City Junction, Pearl City, Oahu, Hawaii, Section 3.3, Earth Tech, March 2003. |
| 16 | Appendix A | Section 2.8.1.3, page 2-18 | Revised Focused Feasibility Study for Pearl City Junction, Pearl City, Oahu, Hawaii, Appendix A, Earth Tech, April 2008. |
| 17 | Appendix B | Section 2.8.2.2, page 2-20 | Revised Focused Feasibility Study for Pearl City Junction, Pearl City, Oahu, Hawaii, Appendix B, Earth Tech, April 2008. |
| 18 | 300.430(a)(1)(iii)(A) | Section 2.9.2.5, page 2-26 | 40 Code of Federal Regulations (CFR) 300. National Oil and Hazardous Substances Pollution Contingency Plan. Available: http://ecfr.gpoaccess.gov . |

Attachment B
Federal Facility Land Use Control ROD Checklist

EPA Region 9 Federal Facility Land Use Control ROD Checklist for Navy LUC RODs**Cross-Check Against Former PCJ Site Record of Decision**

| No. | Checklist Item | Location Where Addressed in the Former PCJ Site ROD |
|-----|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------|
| 1 | Map/Figure showing boundaries of the land use controls. | Figure 1 |
| 2 | Document risk exposure assumptions and reasonably anticipated land uses, as well as any known prohibited uses which might not be obvious based on the reasonably anticipated land uses. (For example, where "unrestricted industrial" use is anticipated, list prohibited uses such as on-site company day-care centers, recreation areas, etc.). | Sections 2.4 and 2.5 |
| 3 | Describe the risks necessitating the LUCs. | Section 2.5 |
| 4 | State the LUC performance objectives. We have had comments on these because several of the objectives have not been clear. The following are some examples of what we have been looking for: <ul style="list-style-type: none"> • Prohibiting digging or disturbing of site soil. • Prohibiting excavation and removal of site soil to an offsite location. • Prohibiting the development and use of the property for residential housing, elementary or secondary schools, and child care facilities. • Ensuring protective covers are maintained. • Ensuring metals have not impacted the underlying shallow groundwater at concentrations that could adversely impact adjacent Pearl Harbor. | Section 2.9.1 |
| 5 | Generally describe the LUC (restriction), the logic for its selection and any related deed restrictions/notifications. | Section 2.9 |
| 6 | Duration language: <i>"Land Use Controls will be maintained until the concentration of hazardous substances in the soil and groundwater are at such levels to allow for unrestricted use and exposure."</i> | Section 2.9 |
| 7 | Include language that the Navy is responsible for implementing, maintaining, reporting on, and enforcing the land use controls. This may be modified to include another party should the site-specific circumstances warrant it. | Section 2.9 |
| 8 | Where someone else will or the Navy plans that someone else will ultimately be implementing, maintaining, reporting on, and enforcing land use controls, the following language should be included: <i>"Although the Navy may later transfer [has transferred] these procedural responsibilities to another party by contract, property transfer agreement, or through other means, the Navy shall retain ultimate responsibility for remedy integrity."</i> | Section 2.9 |
| 9 | Refer to the remedial design (RD) or remedial action work plan (RAWP) for the implementation actions. Because this is a new idea (i.e., including the LUC implementation actions in either or both of these two primary documents), to ensure that the requirement is clear and enforceable, we developed the following language where it makes sense: <i>"A LUC Work Plan will be prepared as the land use component of the Remedial Design. Within 90 days of ROD signature, the Navy shall prepare and submit to EPA for review and approval a LUC Work Plan that shall contain implementation and maintenance actions, including periodic inspections."</i> | Section 2.9 |

Attachment C
RACER Cost Estimate Documentation Reports

Attachment C.1
Estimated Costs for Alternative 2: Land Use Controls

Estimate Documentation Report

System:

RACER Version: 10.3.0
Database Location: E:\60135608 CTO HC03\RACER DBs\CTO HC03 Racer_1030.mdb

Folder:

Folder Name: CTO HC03

Project:

Project ID: Draft Focused Feasibility Study
Project Name: Pearl City Junction
Project Category: None

Location

State / Country: HAWAII
City: PEARL CITY

| Location Modifier | Default | User |
|-------------------|---------|-------|
| | 1.533 | 1.533 |

Options

Database: Modified System
Cost Database Date: 2010
Report Option: Calendar

Description Removal action for soil contaminated by metals, PCBs, and dieldrin.

Estimate Documentation Report

Site Documentation:

Site ID: HC03 Alternative 2
Site Name: HC03 Alternative 2
Site Type: None

Media/Waste Type

Primary: Soil
Secondary: N/A

Contaminant

Primary: Metals
Secondary: PCBs

Phase Names

Pre-Study: ☐
Study: ☐
Design: ☐
Interim/Removal Action: ☐
Remedial Action: ☐
Operations & Maintenance: ☐
Long-Term Monitoring: ☒
Site Close-out: ☐

Documentation

Description: HC03 Alternative 2 Land Use Controls
Implement land use controls at areas where soil contamination is above
unrestricted use cleanup levels.

Perform Five-Year Reviews over a 30-year period.

Support Team: Tom Hanneman
Senior Environmental Engineer
841 Bishop St. Suite 500
Honolulu, HI 96813-3901

References: Draft Final
Record of Decision, Former Pearl City Junction
PEARL CITY, OAHU, HAWAII
April 2010
Department of the Navy
Naval Facilities Engineering Command, Hawaii
400 Marshall Road
Pearl Harbor, HI 96860-3134
Comprehensive Long-Term Environmental Action Navy
Contract Number N62742-03-D-1837, CTO HC03

Estimator Information

Estimator Name: Mike West
Estimator Title: Senior Cost Engineer
Agency/Org./Office: AECOM

Estimate Documentation Report

Business Address: 5575 DTC Parkway Suite 325
Greenwood Village, CO 80111

Telephone Number: 303-224-6777

Email Address: Mike.West2@aecom.com

Estimate Prepared Date: 04/14/2010

Estimator Signature: _____

Date: _____

Reviewer Information

Reviewer Name: Tom Hanneman

Reviewer Title: Senior Environmental Engineer

Agency/Org./Office: AECOM Environment

Business Address: 841 Bishop St. Suite 500
Honolulu, HI 96813

Telephone Number: 808.523.8874

Email Address: tom.hanneman@aecom.com

Date Reviewed: 04/14/2010

Reviewer Signature: _____

Date: _____

Estimated Costs:

| Phase Names | Direct Cost | Marked-up Cost |
|--------------------------------------|-------------|----------------|
| HC03 Alternative 2 5-Year Reviews | \$37,561 | \$104,464 |
| HC03 Alternative 2 Land Use Controls | \$30,495 | \$81,231 |
| <hr/> | | |
| Total Cost: | \$68,056 | \$185,696 |
| Escalation: | \$21,768 | \$59,327 |
| Total Site Cost: | \$89,824 | \$245,022 |

Estimate Documentation Report

Phase Documentation:

Phase Type: Long Term Monitoring
Phase Name: HC03 Alternative 2 Land Use Controls
Description: HC03 Alternative 2 & Land Use Controls Phase
Perform monitoring and enforcement of land use controls at the site.
Phase start date is January 2012.

Start Date: January, 2012
Labor Rate Group: System Labor Rate
Analysis Rate Group: System Analysis Rate
Phase Markups: System Defaults

| Technology Markups | Markup | % Prime | % Sub. |
|----------------------------------|--------|---------|--------|
| ADMINISTRATIVE LAND USE CONTROLS | Yes | 100 | 0 |

Total Marked-up Cost: \$81,231

Technologies:

Estimate Documentation Report

Technology Name: Administrative Land Use Controls (# 1)

User Name: ADMINISTRATIVE LAND USE CONTROLS

| Description | Default | Value | UOM |
|-------------------------------------------|----------------------------------|------------|---------------|
| System Definition | | | |
| Required Parameters | | | |
| Rename Model | ADMINISTRATIVE LAND USE CONTROLS | | n/a |
| Planning Documents | | No | n/a |
| Implementation | | No | n/a |
| Monitoring & Enforcement | | Yes | n/a |
| Monitoring & Enforcement: Start Date | | 2012 | n/a |
| Modification/Termination | | No | n/a |
| Type of Site | Former Government Site | | n/a |
| Monitoring & Enforcement | | | |
| Required Parameters | | | |
| Duration of Monitoring/Enforcement | | 30 | Years |
| Notice Letters | | Yes | n/a |
| Notice Letters: Number | | 2 | EA |
| Notice Letters: Frequency | | Biennially | n/a |
| Guard Service/Security | | No | n/a |
| Reports & Certifications | | Yes | n/a |
| Reports & Certifications: Frequency | | Biennially | n/a |
| Site Visits/Inspections | | Yes | n/a |
| Site Visits/Inspections: Number | | 1 | EA |
| Site Visits/Inspections: Safety Level | | D | n/a |
| Site Visits/Inspections: Duration | | 1 | Days |
| Site Visits/Inspections: Number of People | | 1 | EA |
| Site Visits/Inspections: Frequency | | Biennially | n/a |
| Site Visits/Inspections: Airfare | | 0 | \$ Per Ticket |
| Site Visits/Inspections: Mileage | | 15 | MI |

Comments: Perform Monitoring and Enforcement of the Land Use Controls over a 30-Year period.

Estimate Documentation Report

Phase Documentation:

Phase Type: Long Term Monitoring
Phase Name: HC03 Alternative 2 5-Year Reviews
Description: HC03 Alternative 2 Five-Year Review Phase
Conduct six (6) 5-year reviews.
Phase start date is January 2012.

Start Date: January, 2012
Labor Rate Group: System Labor Rate
Analysis Rate Group: System Analysis Rate
Phase Markups: System Defaults

| Technology Markups | Markup | % Prime | % Sub. |
|--------------------|--------|---------|--------|
| Five-Year Review | Yes | 100 | 0 |

Total Marked-up Cost: \$104,464

Technologies:

Estimate Documentation Report

Technology Name: Five-Year Review (# 1)

| Description | Default | Value | UOM |
|--------------------------------------------|---------|--------------|-----|
| System Definition | | | |
| Required Parameters | | | |
| Site Complexity | | Low | n/a |
| Document Review | | Yes | n/a |
| Interviews | | Yes | n/a |
| Site Inspection | | Yes | n/a |
| Report | | Yes | n/a |
| Travel | | No | n/a |
| Rebound Study | | No | n/a |
| Start Date | | January-2012 | n/a |
| No. Reviews | | 6 | EA |
| Document Review | | | |
| Required Parameters | | | |
| 5-Year Review Check List | | Yes | n/a |
| Record of Decision | | No | n/a |
| Remedial Action Design & Construction | | No | n/a |
| Close-Out Report | | No | n/a |
| Operations & Maintenance Manuals & Reports | | No | n/a |
| Consent Decree or Settlement Records | | No | n/a |
| Groundwater Monitoring & Reports | | No | n/a |
| Remedial Action Required | | No | n/a |
| Previous 5-Year Review Reports | | Yes | n/a |
| Interviews | | | |
| Required Parameters | | | |
| Current and Previous Staff Management | | Yes | n/a |
| Community Groups | | No | n/a |
| State Contacts | | No | n/a |
| Local Government Contacts | | No | n/a |
| Operations & Maintenance Contractors | | No | n/a |
| PRPs | | No | n/a |
| Remedial Design Consultant | | Yes | n/a |
| Site Inspection | | | |
| Required Parameters | | | |

Estimate Documentation Report

Technology Name: Five-Year Review (# 1)

| Description | Default | Value | UOM |
|---------------------------------------------------|---------|-------|-----|
| Site Inspection | | | |
| Required Parameters | | | |
| General Site Inspection | | Yes | n/a |
| Containment System Inspection | | No | n/a |
| Monitoring Systems Inspection | | No | n/a |
| Treatment Systems Inspection | | No | n/a |
| Regulatory Compliance | | Yes | n/a |
| Site Visit Documentation (Photos, Diagrams, etc.) | | Yes | n/a |
| Report | | | |
| Required Parameters | | | |
| Introduction | | Yes | n/a |
| Remedial Objectives | | No | n/a |
| ARARs Review | | No | n/a |
| Summary of Site Visit | | Yes | n/a |
| Areas of Non Compliance | | Yes | n/a |
| Technology Recommendations | | Yes | n/a |
| Statement of Protectiveness | | No | n/a |
| Next Review | | Yes | n/a |
| Implementation Requirements | | Yes | n/a |

Comments:

Estimated Costs for Alternative 3: Cleanup for Unrestricted Land Use

Estimate Documentation Report

System:

RACER Version: 10.3.0
Database Location: E:\60135608 CTO HC03\RACER DBs\CTO HC03 Racer_1030.mdb

Folder:

Folder Name: CTO HC03

Project:

Project ID: Draft Focused Feasibility Study
Project Name: Pearl City Junction
Project Category: None

Location

State / Country: HAWAII
City: PEARL CITY

| Location Modifier | Default | User |
|-------------------|---------|-------|
| | 1.533 | 1.533 |

Options

Database: Modified System
Cost Database Date: 2010
Report Option: Calendar

Description Removal action for soil contaminated by metals, PCBs, and dieldrin.

Estimate Documentation Report

Site Documentation:

Site ID: HC03 Alternative 3
Site Name: HC03 Alternative 3
Site Type: None

Media/Waste Type

Primary: Soil
Secondary: N/A

Contaminant

Primary: Metals
Secondary: PCBs

Phase Names

Pre-Study: ☐
Study: ☐
Design: ☒
Interim/Removal Action: ☐
Remedial Action: ☒
Operations & Maintenance: ☐
Long-Term Monitoring: ☐
Site Close-out: ☐

Documentation

Description: Alternative 3 Soil Removal to Unrestricted Use
Excavation and mainland disposal of soil contaminated with metals, PCBs, and dieldrin to allow for unrestricted use.

Support Team: Tom Hanneman
Senior Environmental Engineer
841 Bishop St. Suite 500
Honolulu, HI 96813-3901

References: Draft Final
Record of Decision, Former Pearl City Junction
PEARL CITY, OAHU, HAWAII
April 2010
Department of the Navy
Naval Facilities Engineering Command, Hawaii
400 Marshall Road
Pearl Harbor, HI 96860-3134
Comprehensive Long-Term Environmental Action Navy
Contract Number N62742-03-D-1837, CTO HC03

Estimator Information

Estimator Name: Mike West
Estimator Title: Senior Cost Engineer
Agency/Org./Office: AECOM
Business Address: 5575 DTC Parkway Suite 325
Greenwood Village, CO 80111

Estimate Documentation Report

Telephone Number: 303-224-6777

Email Address: Mike.West2@aecom.com

Estimate Prepared Date: 04/14/2010

Estimator Signature: _____

Date: _____

Reviewer Information

Reviewer Name: Tom Hanneman

Reviewer Title: Senior Environmental Engineer

Agency/Org./Office: AECOM Environment

Business Address: 841 Bishop St. Suite 500
Honolulu, HI 96813

Telephone Number: 808.523.8874

Email Address: tom.hanneman@aecom.com

Date Reviewed: 04/14/2010

Reviewer Signature: _____

Date: _____

Estimated Costs:

| Phase Names | Direct Cost | Marked-up Cost |
|----------------------------------------------|-------------|----------------|
| HC03 Alternative 3 Remedial Design | \$0 | \$173,909 |
| HC03 Alternative 3 Contaminated Soil Removal | \$6,272,606 | \$7,642,627 |
| <hr/> | | |
| Total Cost: | \$6,272,606 | \$7,816,536 |
| Escalation: | \$195,705 | \$240,885 |
| Total Site Cost: | \$6,468,311 | \$8,057,421 |

Estimate Documentation Report

Phase Documentation:

Phase Type: Design Percent Method
Phase Name: HC03 Alternative 3 Remedial Design
Description: HC03 Alternative 3 Remedial Design
These costs will cover the RAC Planning & Mobilization.

Total Capital Costs are the marked up costs for the items listed below, excluding the Professional Labor Management, Administrative Land Use Controls, and Operations and Maintenance technologies. Only the first year costs are included for cost-over-time technologies.

| Phase Name | Phase Date | Design Approach | Total Capital Cost | Design % | Design Costs | Design Cost Year |
|----------------------------------------------|---------------|--------------------------------------------------|--------------------|----------|--------------|------------------|
| HC03 Alternative 3 Contaminated Soil Removal | January, 2012 | Ex Situ Removal - Off-site Treatment or Disposal | \$6,956,343 | 2.50 | \$173,909 | 2011 |

Total Design Cost: \$173,909

Estimate Documentation Report

Phase Documentation:

Phase Type: Remedial Action
Phase Name: HC03 Alternative 3 Contaminated Soil Removal
Description: HC03 Alternative 3 Remedial Action Phase
Demolish building to allow access to contaminated soil.
Excavate soil to allow for unrestricted use.
Transport asphalt to a recycling facility.
Replace concrete slab and walls for building.
Transport and disposal of the contaminated soil from Honolulu to
Buttonwillow, CA.
Professional Labor Management for contractor management of the
remediation work.
Phase start date is January 2012.

Approach: Ex Situ
Start Date: January, 2012
Labor Rate Group: System Labor Rate
Analysis Rate Group: System Analysis Rate
Phase Markups: System Defaults

| Technology Markups | Markup | % Prime | % Sub. |
|-------------------------------------------|--------|---------|--------|
| Demolition, Buildings | Yes | 100 | 0 |
| Excavation | Yes | 100 | 0 |
| Load and Haul | Yes | 100 | 0 |
| REPLACE CONCRETE FLOOR AND EXTERIOR WALLS | Yes | 100 | 0 |
| Residual Waste Management | Yes | 100 | 0 |
| Professional Labor Management | Yes | 100 | 0 |

Total Marked-up Cost: \$7,642,627

Technologies:

Estimate Documentation Report

Technology Name: Demolition, Buildings (# 1)

| Description | Default | Value | UOM |
|--------------------------------------------|---------|-------------|-------|
| System Definition | | | |
| Required Parameters | | | |
| Building Area | | 2,500 | SF |
| Type of Building | | Concrete | n/a |
| Include Load and Haul Costs | | Yes | n/a |
| Amount of Hazardous Material | | 0 | % |
| Number of Stories | | Single | n/a |
| Safety Level | | D | n/a |
| Height/Demo Factor | | | |
| Secondary Parameters | | | |
| Floor to Floor Height | 12 | 15 | FT |
| Demolition Factor | 0.03 | 0.0275 | CY/CF |
| Load and Haul | | | |
| Secondary Parameters | | | |
| Non-Hazardous Material: Truck Type | | Highway | n/a |
| Non-Hazardous Material: Volume | | 1,032 | CY |
| Non-Hazardous Material: Distance (One-way) | | 8 | MI |
| Non-Hazardous Material: Dump Charge | | 15 | \$/CY |
| Hazardous Material: Truck Type | | Off Highway | n/a |
| Hazardous Material: Volume | | 0 | CY |
| Hazardous Material: Distance (One-way) | | 0 | FT |
| Hazardous Material: Dump Charge | | 0 | \$/CY |

Comments: Assumed building demolition 50' x 50' area for concrete floor and first floor exterior walls only.

Estimate Documentation Report

Technology Name: Excavation (# 1)

| Description | Default | Value | UOM |
|------------------------------------------------|----------------------|----------------------------|-----|
| System Definition | | | |
| Required Parameters | | | |
| Estimating Method | | Area / Depth | n/a |
| Area | | 1.4187 | AC |
| Depth | | 2 | FT |
| Soil Type | | Sand/Gravelly Sand Mixture | n/a |
| Safety Level | | D | n/a |
| Excavation | | | |
| Secondary Parameters | | | |
| Existing Cover | Soil/Gravel | Asphalt | n/a |
| Replacement Cover | Soil/Seeding | Asphalt | n/a |
| Sidewall Protection | None | None | n/a |
| % of Excavated Material To Be Used as Backfill | 0 | 0 | % |
| Source of Additional Fill | Off Site | Off Site | n/a |
| Backfill Hauling Distance (one way) | 10 | 10 | MI |
| Dewatering Required | No | No | n/a |
| Analytical | | | |
| Secondary Parameters | | | |
| Primary Analytical Template | System Soil - Metals | System Soil - Metals | n/a |
| Secondary Analytical Template | System Soil - PCBs | System Soil - PCBs | n/a |
| Number of Sampling Points/Locations | 103 | 103 | EA |
| Number of Composites Submitted to Lab | 26 | 26 | EA |
| Turnaround Time | Standard (21 Days) | Standard (21 Days) | n/a |
| Submit Data Electronically | Yes | Yes | n/a |
| Data Package / QC | Stage 1 | Stage 3 | n/a |
| Lab Data Review | Stage 1 | Stage 3 | n/a |
| Sampling Reports | Abbreviated | Standard | n/a |

Comments: Multiple excavation areas included in total excavation area of 61,800 SF (1.4187 Acres) based on the Dragt Final ROD Section 2.8.13. The excavation depth will be 2.0-FT.

Estimate Documentation Report

Technology Name: Load and Haul (# 1)

| Description | Default | Value | UOM |
|-----------------------|---------|---------|-------|
| System Definition | | | |
| Required Parameters | | | |
| Truck Type | | Highway | n/a |
| Volume | | 1,145 | CY |
| One-way Haul Distance | | 8 | MI |
| Dump Charge | | 15 | \$/CY |
| Safety Level | | D | n/a |

Comments: Transport 1,145 CY of asphalt to the Grace-Pacific recycling facility at 91-920 Farrington Highway, Kapolei, HI, 8 miles from Pearl City. Entered a dump charge of \$15/CY as a recycling fee.

Technology Name: User Defined Estimate (# 1)

User Name: REPLACE CONCRETE FLOOR AND EXTERIOR WALLS

| Description | Default | Value | UOM |
|---------------------|---------|-------------------------------------------------|-----|
| System Definition | | | |
| Required Parameters | | | |
| Model Name | | REPLACE CONCRETE FLOOR AND EXTERIOR WALLS | n/a |
| WBS Type | | HTRW | n/a |
| Selected WBS | | 331.20.03 | n/a |
| Safety Level | | E | n/a |

Comments: Replacement of concrete floor and exterior walls to a max height of 15-FT. Assumed that walls are 50-FT long by 15-FT high and 6-inches thick.

Estimate Documentation Report

Technology Name: Residual Waste Management (# 1)

| Description | Default | Value | UOM |
|---------------------------------|---------|-------------------------------|----------------|
| System Definition | | | |
| Required Parameters | | | |
| Safety Level | | D | n/a |
| Non-Rad Disposal | | | |
| Required Parameters | | | |
| Waste Type / Condition | | Hazardous Roll-Off Containers | n/a |
| Total Quantity | | 5,264 | CY |
| Quantity of Disposal Containers | | 176 | Roll-Off Cont. |
| Stabilization | | No | n/a |
| Transportation Type | | Truck / Barge | n/a |
| Truck Distance (One-way) | | 175 | Miles |
| Barge Distance (One-way) | | 2,243 | Miles |

Comments: Transport and disposal of non-backfilled soil from the excavation, which will be placed into 30-CY roll-off containers. The roll-off containers will be taken 10 miles to the Port of Honolulu, loaded onto a ship, and transported 2,243 miles to the Port of Long Beach, CA. The drums and roll-offs will be transferred to trucks and transported to the Clean Harbors Buttonwillow landfill, 165 miles from Long Beach.

Technology Name: Professional Labor Management (# 1)

| Description | Default | Value | UOM |
|---------------------------------|---------|-----------|-----|
| System Definition | | | |
| Required Parameters | | | |
| Markedup Construction Cost (\$) | | 6,794,894 | \$ |
| Percentage | 10 | 10.1 | % |
| Dollar Amount | | 686,284 | \$ |

Comments: The Professional Labor Management technology uses a percentage method to calculate management labor costs incurred by the project. Professional Labor Management includes activities that are not accounted for within the Field Overhead/G&A, Overhead, or Owner's Cost factors of the phase mark-up template. The activities encompassed by this technology are for costs generally incurred during the removal/interim action and remedial action phases of the environmental remediation process. The technology uses the Marked-up Construction Cost (\$) to calculate a default percentage for contractor professional labor costs. This percentage was increased to include the building slab and wall demolition and replacement.

